

Exploring the Mind of God

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About the author



[Dr. Anil K. Rajvanshi](#) has more than 40 years of experience in renewable energy R&D and rural development. He did his B.Tech and M.Tech in Mechanical Engineering from Indian Institute of Technology (IIT) Kanpur in 1972 and 1974 respectively. He received his Ph.D. in Mech. Engg. from University of Florida, Gainesville, USA in 1979 under solar energy pioneer Dr. Eric Farber. He was on the faculty of University of Florida (Dept. of Mechanical Engineering) for 2 years before returning to India in 1981 to run his own rural NGO - [Nimbkar Agricultural Research Institute \(NARI\)](#) in Phaltan, Maharashtra.

NARI has done pioneering work in agriculture, renewable energy and sustainable development areas specially those affecting rural population. Dr. Rajvanshi has devoted the last 40 years at NARI to [apply sophisticated science and technology to solve the problems faced by the rural people](#) in the areas of energy, water, pollution and income generation, broadly based on renewable energy in environmentally sound ways.

Dr. Rajvanshi has written extensively on his work on rural self-sufficiency and has attracted the attention of the print and visual media worldwide. He has more than 230 publications; [four books and chapters in various books](#); and 7 patents to his credit. He has been inducted into several prominent committees of the government of India at the national and state level. He is the principal author of the Govt. of India national policy on [Energy Self Sufficient Talukas](#).

For his work, Dr. Rajvanshi has received a number of prestigious national and international awards, such as [Jamnalal Bajaj Award](#), induction to the [U.S. based Solar Hall of Fame](#), Austria based **Energy Globe Award**, Federation of Indian Chambers of Commerce and Industries ([FICCI Annual Award](#)), Sweden based [Globe Award](#), [Distinguished Alumnus Award from University of Florida](#) (he is the first Indian to receive this award), [Notable Alumni of IIT Kanpur](#), among others. In 2022 he was given one of India's highest civilian award - [The Padma Shri](#).

Exploring the Mind of God

He has been a featured speaker at many prominent institutes, conferences, and forums, both in India and U.S. and lectures regularly on the issues of sustainability and rural development.

Besides his engineering work, he is also involved in studies of human consciousness and the interaction of spirituality and technology. His [writings](#) on these issues have appeared regularly in Times of India in Speaking Tree column. He also writes a [blog in Times of India](#), [Huffington Post](#), [Thrive Global](#) and [South Asia Monitor](#).

He is an author of a book entitled, [“Nature of Human Thought”](#), which tries to bring about a synthesis of ancient Indian Yogic thought and modern cosmology and brain research. The book contains many essays on spirituality and technology and reflects his belief that sustainability and spirituality go hand in hand. He has also penned his memoirs of his US student days in a book entitled [“1970s America - An Indian Student’s Journey”](#). Recently he has written [his autobiography in e-book format](#)

Book Reviews

1. While I browsed through the PDF of Exploring the Mind of God penned by you it was nice to note that the entire work spoke volumes of your honest intent and hard work, besides letting the reader know the far-reaching effects of Spirituality - shaking hands with Technology for a better world.

As you are aware Yoga in the broad terminology used in our university consisting of Jana, Bhakti, Patanjali's Yoga as Raja Yoga and Karma Yoga presents Spirituality in its finest shape avoiding religious leanings.

The advantages of technology and spirituality coming together are innumerable as envisaged by you in your book. The very points that men will wage no more wars, no more pain/discomfort and that diseases will do a vanishing act, in itself fills the heart with hopes and that there will be an end to all that the chaos created by mankind.

The glorious dream of creating an environment that is viable and sustainable could be realized by gaining supernatural powers using time tested methods of working on our minds;**(using the same for the good of the society and not for one's ego growth)**, all our collective efforts would lead to creating a paradise on Earth.

Most of the points mentioned in your book are well thought of and more than convincing as they have their bearing from the ancient insights of Sanatana Dharma; the scriptural wisdom that strongly portray the means to achieve the liberation **(Manifestation of Divinity in us)** which is the very purpose of all our lives. I would completely subscribe to the idea when you say that spirituality is all about compassion and service for lives, strong belief in coexistence, and respect for nature. Although happiness is a term that is relative, yet an over well-being of the society is not a very far-fetched dream. Yoga bringing mastery over the mind leading to Silence and that Silence is bliss will surely help.

I do highly appreciate your efforts and wish you a lot of success in all your endeavors that would make a positive difference to this society.

Dr. H.R. Nagendra

Vice Chancellor, Svyasa deemed University, Bangalore

-
2. The book has a wonderful glimpse of the purpose of life and explains meditation in a very lucid manner. It is an ultimate book for a better body and a healthy mind. The book scientifically explains our connection to the Universe at large and the correlation between Death, Karma and Reincarnation.

Wishing you a Very Happy New Year 2022 ahead.

Dr. Dhrubajyoti Chattopadhyay, Vice Chancellor, Sister Nivedita University, Kolkata.

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3. [Spirituality can lead to genuine happiness](#). A book review published by Mr. M. R. Narayan Swamy in South Asia Monitor. 16 February 2022.

About the book

This book is an attempt to show how technology guided by spirituality can lead to happiness and in the process may lead to understanding the Universal Consciousness or the Mind of God.

Dr. Anil K. Rajvanshi has been writing on the issues of spirituality for more than 20 years. He has published many articles on this subject in Times of India (Speaking Tree), Huffington Post, Thrive Global, South Asia Monitor and in various news lines as syndicated articles. He has now put together most of these articles in this book.

The book is divided into three sections. The first section is on how to make the mind powerful so that inner peace results. A happy and contented mind then sees the world accordingly.

The second section is on how to improve the environment through technology, so it becomes liveable and sustainable. No matter how contented the mind is, its power is enhanced many times if it encounters a pleasant, healthy, and sustainable environment. And the last section is about exploring space - the last frontier which can help in joining the individual with the Universal Consciousness and understanding the mind of God.

Before the start of each section an introduction summarizes the contents of the articles contained in that section.

Dr. Rajvanshi believes that the Mantra of India's and world development should be spirituality with high technology. In this belief he has been inspired by Patanjali's Yoga Darshan where Sage Patanjali has shown that a Yogi by gaining supernatural powers to overcome the vagaries of nature can accelerate his path to liberation and achieving everlasting happiness.

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Why I wrote this book?

World is going through tremendous crisis. On one hand it must cope with ever increasing pandemics like COVID, flu, HIV etc. and on the other hand the earth- warming trend is creating large scale climate catastrophes with unseasonal heavy rains, flash flooding, heat waves, large scale forest fires, etc.

Both these issues have created an element of fear and have played havoc with the general well-being and happiness of mankind. They are also an outcome of our unsustainable lifestyle [1].

Sustainable living and happiness should start with each one of us and if we make them as central issues in our lives then we can make this world a better place for future generations [2]. We should therefore continuously strive to develop systems and mechanisms to achieve these goals

Both happiness and sustainable living can be achieved by spirituality and judicious use of technology and thus happiness, sustainable living and technology are related to spirituality.

I started writing about these issues almost 20 years ago [3]. Most of these articles were published in Speaking Tree column of Times of India, in Huffington Post and as syndicated articles in various news lines, papers, etc. [4]. Some of these articles were published in 2004 in my first book entitled Nature of Human Thought [5]. Since then, I have published many more articles on this subject [3,4].

They were all standalone articles and were well received by readers. Hence, I thought of putting most of them together in one place. This book is an outcome of that desire and is a sequel to my earlier book Nature of Human thought [5]. I have also tried to show how technology and spirituality are connected and that happiness results due to their interplay [6].

The theme of the book also reflects my personal journey. My spiritual journey started at the age of 13 [7]. I have written about it in some detail in

section Better Body (article 33). The initial journey was about self-discovery and training of the mind through meditation which led to getting some interesting spiritual experiences.

As the mind became stronger and powerful through meditation the yearning for experience and knowledge started. This was the mind-expanding phase which was also helped by my education as an engineer and especially solar engineer [8]. Engineering opened new vistas and expanded my vision field.

The learning of solar energy principles, its engineering and related development in U.S. gave me the knowledge about the environment and instilled in me the love of nature [9].

After I came back to India from the U.S. in 1981, I continued this journey of exploration and improving my immediate environment through technology [10]. This in turn made me look at my spiritual yearnings in a new light.

During the U.S. days as my mind expanded with new experiences and information, it started on the journey of learning about space, gravitation, and stars [9]. I felt it was a natural progression of a curious and powerful brain.

Thus, what I have written in this book reflects my personal journey in the matters of spirituality, technology, happiness and understanding the mind of God. This theme also mirrors that in Patanjali Yoga Sutras. I have been inspired by his spirit and the similarity between this book and his Yoga sutras must have been an outcome of that influence.

Since this book reflects my personal journey, I hope it inspires some bright and dedicated young students who want to do things differently and where the focus is not money but leading a fulfilling and happy life. Thus I have made the book freely available on the internet and do hope that it can be made easily available in the libraries of schools and colleges throughout the country.

Exploring the Mind of God

The book is divided into three sections. The first section has 34 essays on how to make the mind powerful so that inner peace results. A happy and contented mind then sees the world accordingly.

The second section has 17 essays on how to improve the environment through technology, so it becomes liveable and sustainable. No matter how contented the mind is, its power is enhanced many times if it encounters a pleasant, healthy, and sustainable environment.

And the last section which contains 16 essays is about exploring space - the last frontier which fills us with awe and wonderment about the marvellous Universe and can help in joining the individual with the Universal Consciousness and ultimately in understanding the mind of God.

I do hope the readers enjoy this journey. After every article a QR code allows the reader to access references.

Anil K Rajvanshi
Phaltan, Maharashtra, India
January 2021



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I am indebted to large number of people who have read the articles, commented on them, and offered valuable suggestions for their improvement.

But mostly I am grateful to my wife Nandini Nimbkar who has gone through every word with a critical eye and has done an excellent job in editing the whole book.

Thanks are also due to my younger daughter Madhura with whom I sat for innumerable hours discussing and fine tuning the book. Her valuable inputs helped me shape the book. Thanks are to my older daughter Noorie who suggested many changes and did excellent formatting for Kindle edition.

Thanks, are also due to several of my friends who have provided valuable suggestions on different essays. Among them I would like to single out Dr. K.S. Jayaraman, Mr. Rahul Bajaj, Dr. Subhash Lakhotia, Narayani Ganesh and Tarun Basu and his team at South Asia Monitor. Thanks are also to Kavita Majumdar, Anuradha Kedia and her team at Better India, Ashvina Vakil, Vishnu Makhijani, among others for editing some essays.

Thanks are to Rahul Pisharody for designing the cover and to T. Harishankar for making the promotional video and putting some of these essays as podcasts [1]. Thanks are to Shivam Patange who did an excellent job in formatting the book, creating endnotes, references, and index. Finally, thanks to Sanjay Aherrao for making my illegible long handwriting printable and typing innumerable drafts of the book.



Theme



More than 18 years' ago I wrote my first article on Spirituality for Times of India column 'Speaking Tree' [1]. The subject was how technology and spirituality are related. I believe that was probably the first article on this subject anywhere and seemed like a novel perspective since science, spirituality, and technology were not supposed to mix.

Since then I have written scores of articles on how spirituality and technology are related [2]. This issue is in vogue now, hence I thought of revisiting the topic and presenting the point of view that both technology and spirituality are important in achieving happiness and is the subject of this book. Also, the exploration of this combination has led me to the inquiry regarding the whole purpose of life and ultimately about Universal Consciousness or basically the mind of God. ***Thus, in essence this book is about exploring the larger issues of life and cosmos aided by spirituality and technology.***

This idea about the relationship of technology and spirituality is not new since our ancient rishis understood the importance of technology in a Yogi's life. One of the oldest books on *Yoga* is *Patanjali Yoga Darshan* [3]. Almost

one fourth of the book is devoted to how a *Yogi* can achieve superhuman powers to free himself from the vagaries of nature. These powers do not come to a *Yogi* naturally, but he/she must obtain them by the practice of *Sanyam* (combination of concentration, contemplation, and Samadhi) on different parts of the body.

A question can be asked as to why *Patanjali* devoted one fourth of the book on how to achieve these powers. And a simple answer is that by overcoming the challenges of the natural world, ***something we do regularly with technology***, a *Yogi's* life was made easy so that he/she could devote his/her energies in pursuit of truth, happiness, and attainment of salvation from the cycle of birth and death. Besides, this section on attaining supernatural powers is placed in the later part of the book after *Patanjali* has described in detail how a *Yogi* can master the discipline of *Yoga*. Thus, by mastering the art of meditation and *Sanyam*, a *Yogi* can ***gain wisdom*** to use these powers judiciously and not be swayed by them.

This book mirrors the strategy of Patanjali yoga darshan and follows the sequence of mind control and making it powerful; improving the environment with technology; and lastly exploring the possibility of space travel either with the body or without it. I have therefore been guided by the spirit of sage Patanjali and have been inspired by the science in his yoga sutras [4].

Happiness as an Engine of Progress

All of us aspire to have a good life and happiness [5]. It is what drives us in life. There are as many definitions of happiness as there are people. But generally, people want a decent place to live; mobility; good and wholesome food; good education for their children; clean environment; a challenging and pleasant workplace; good and wholesome entertainment; and enough money and resources to meet their usual daily requirements.

Exploring the Mind of God

These are the issues around which the modern industrial societies have evolved though this has created the biggest problem of totally unsustainable lifestyles fuelled by greed. Thus, the climate change; food shortages; economic meltdown; increasing pandemics; and other subsequent social problems are direct result of our greed for resources and energy. Hence the control of greed or better yet the sublimation of greed emotions into higher ones like humility and simplicity can lead to sustainability, happiness, and a rewarding life.

Happiness is a state of mind. We feel happy and enjoy life through our senses and the mind. Brain processes the information from the senses and our level of happiness is dictated by its processing power. A powerful brain (the processor) which produces deep thought can therefore extract more information from the sensory signals and can give us more happiness as it is easily able to satisfy the mind. Besides, it can look at a greater number of eventualities and hence can resolve the issues amicably.

A smaller processor obviously needs many more inputs to reach the same enjoyment or satisfaction level. Thus, weaker brains need more resources to occupy them, and this leads to greed and unsustainable lifestyle. **Therefore, one of the prerequisites to having happiness and consequently a sustainable lifestyle is development of a powerful and smart brain.** Such a brain allows us to think deeply or concentrate on any subject during which we can get “lost” in processing the information about it.

Attainment of happiness is the goal of all religions and almost all spiritual writings are about how to achieve it. Most of the religions have focused on detachment, renunciation, and elimination of desire. Some use this to control others by promising happiness in afterlife. However, **one can find happiness in this life and our world.** We will therefore try to explore how one can lead a happy life by making our brain powerful through spirituality and then using it to solve our problems through technology. This can help in

channelling our desires into fruitful avenues and by curbing or sublimating our greed impulses.

What is spirituality?

Spirituality is concerned with the matters of spirit. When we think deeply and for a long time about anything whether it is an idea or an object then the brain has a tendency of focusing on it like a laser and in that process the object vanishes from the vision field and only its germ or the spirit remains. Then complete knowledge of that idea or object results and is called *Sanyam* by *Patanjali*. This is the mechanism by which all great discoveries are made [6]. It is this deep thinking on anything which makes us spiritual and gives us a sense of peace and happiness [7].

Spirituality is not religion. It is the state of mind that makes it understand that the Truth is beyond the barriers of worldliness, religion, caste, creed, race, or geographical boundaries. It connects us to marvels of nature in a deep way and subsequently to Universal Consciousness or the mind of God.

Spirituality also helps us to have a compassionate view of nature and as we evolve spiritually, we become more tuned to it which helps us in preserving it. Besides, it gives us a sense of connection to other living beings and thus helps us to live in harmony with each other and enables everybody to work together for the common good. ***This is the genesis of non-violence.*** In all religions the respect for nature and life and hence non-violence is preached, and the maxim of simple living and high thinking is ingrained in its teachings.

Technological progress

Since time immemorial mankind has always strived to make their life easier. This has been the engine of technological innovation and growth. In this effort mankind has been guided mostly by the nature and its designs.

Thus, technological progress unravels a lot of hidden areas of nature and shows us how it performs its miracles. In doing this, technology helps us understand the power and greatness of nature. For example, humans felt that they had invented and developed fibre optics. However, scientists have found that the root systems of plants are excellent optical fibres – something that has existed in nature for millions of years [8]. This knowledge could only come once we had enough technology for creating fibre optics, lasers etc.

Similarly, a new science of biomimicry or “copy the nature”, is developing where we are finding that nature, which has billions of years of head start, has far better answers than we have in almost every aspect of life and hence realization has dawned that our technological progress will take a quantum leap by copying nature’s designs. In fact, daily we discover that there is nothing new under the sun and all our inventions have been preceded by nature’s designs of millions of years ago.

Thus, as we progress ahead in the technological area, we will discover the great laws of nature and ultimately God. ***For God is nothing else but this marvellous Universe which follows its own scientific laws.***

I also feel that it is the law of evolution that as we evolve spiritually, ***we will also become a technologically advanced civilization.*** This is because when we apply our sharpened brains to any problem, then solutions result. Also, spiritual advancement gives us wisdom to utilize the technology judiciously for mankind’s benefits. This is also the reason why *Patanjali* put the conquest of physical nature by obtaining supernatural powers as third chapter in his four-chapter book.

The nature of brain is such that as we make it powerful and increase its processing power, it wants to increase its inputs and experiences. This includes the mind-expanding process of understanding the world, cosmos and ultimately the universe. This leads to the desire to explore and travel in

space and intergalactically. That can however be achieved only by very advanced technological progress and is the ***genesis of conquest of space.***

Quite often technology and wisdom have gone hand in hand. Though we have developed weapons of mass destruction, the collective wisdom of mankind has not allowed us to annihilate each other. The fact also remains that many more people used to be killed in wars when technology was very rudimentary. In today's war fewer human lives are lost.

Most of the wars are resource related. As we advance spiritually and technologically, we will stop waging wars since the resources available will be converted more efficiently to provide creature comforts to all of mankind. I am sure that as ***the level of technological progress increases, we will use it judiciously to further raise our levels of consciousness and not use it to harm mankind.*** The power of technology for mass communication also teaches and spreads the message of moderation.

Putting it all together

Our technological and spiritual progress can be explained by giving the example of the path that particles and molecules take in water heated in a container [9]. Each individual particle or molecule darts randomly in the water container depending upon the heat energy given to it but overall, a stream is formed so that the warm water rises, and the cold water comes down to be heated. These are convection cells commonly seen when water is heated or boiled. Individual particles dart furiously in these streams but are restricted by the convection cell boundaries.

Similarly, as individuals we create technologies for our own selfish needs and depending on our spiritual progress may or may not use them for the betterment of mankind. But collectively the spiritual and technological progress follows the natural evolution of humans towards an advanced civilization just like the stream of heated water in a utensil. And all our

individual shortcomings are swept away for general good by the stream of evolution.

We feel and enjoy this world through the sense organs of our bodies. Getting a human body is the pinnacle of evolution and the most important gift of nature. Almost all technological interventions are therefore to enhance this sense-world interaction.

In coming years technology will provide us tools to create a much more hospitable planet in which majority of mankind will be able to live comfortably. It will help us repair our bodies and produce designer drugs which will make us live longer with less disease and pain. In fact, the whole basis of *Yoga* according to *Patanjali* is to make the human body fit for spiritual experience and happiness. Our future medicines will allow us to do this. ***This increased level of physical comfort will allow us a quantum jump in our quest of spirituality and happiness.***

Nevertheless, the next biggest technological and spiritual challenge for mankind is to enable two billion people, who live in conditions of utter poverty, to improve their quality of life. They cannot think about spiritual matters since their basic needs are still unmet. Technology can help in improving their quality of life. It is not an easy task to achieve but I feel that mankind has enough ingenuity and resources to do this.

With better international cooperation in technological fields, it will be possible to provide very efficient and economically viable technologies to the developing world. How many years it will take we do not know but I feel optimistic that it will eventually be done. Once the quality of life of bottom of pyramid population is improved then their progress to spirituality and happiness will be rapid. I therefore think that the ***mantra for India's and world's development should be spirituality with high technology.***

Exploring the Mind of God

How we as individuals can help in this development? To reduce our greed for resources and simplify our lives we need to make our minds very powerful. This process should start at young age. We need to inculcate in our children the merits of deep introspection and try to wean them away from instant reaction process of social media. It is a tall order but all of us must pitch in.

For older people regular meditation helps in achieving calmness of mind and happiness. This together with the judicious use of modern technology will lead us to a happy and sustainable life.

Today far more people than ever before believe in life after death, in spiritual matters and in extrasensory perception. Popular poll after poll has shown this trend all over the world. I believe this has only come about because of the ability of human beings, through technological progress, to research these areas. For example, we can now map the brain with the latest tools of MRI and can even “see” what the brain is doing in a heightened state of spiritual experience. Similarly, we can peer through extremely sophisticated telescopes to see the unfolding of the great drama of galaxy formation. It fills us with awe and amazement. ***Thus, we are creating the building blocks of the laws of spirituality by poking deeper and deeper into nature with the help of technological tools.***

Through the compilation of articles in this book, I have tried to explore the connection between spirituality, technology, and happiness and in doing so have tried to understand the bigger picture of life and universe. I believe that if we can effectively blend technology with our spiritual pursuits, we will be on the path to happiness and understanding the mind of God.

Each of these articles have been published earlier as a standalone one. I have taken the liberty of revising some of them and putting them together in three sections so that they help provide some clarity on the subject. There will be some repetitions and I request the indulgence of the readers.

Exploring the Mind of God

Before the start of each section, I have included an introduction which gives in a nutshell what the section contains.



Section I: Inner Peace

Introduction

The first section of the book contains four parts all focusing on how to create inner peace.

The first part defines and talks about the basic theme of the book – happiness; and deals with the issues of what is happiness and how to achieve it.

Happiness is a state of the mind and thus a powerful mind can create happiness. The second part therefore contains essays showing how to create a powerful mind through meditation. Specifically, what is meditation, how to do it and what are its attributes.

Development of a powerful mind is also helped through the resolution of its conflicts. The conflicts are caused by the psychological knots produced by emotions. The third part of this section contains essays about the nature of emotions, their origin, and their resolution.

And the final part of the section deals with the attributes of a healthy body. A healthy body supports a powerful mind. Thus, the essays in this part talk about how to have a healthy body through exercise; good sleep; and through the use of alternative medicines.

The last article in this section is about my spiritual experiences which have guided me on the path of spirituality and provided the inspiration to write this book.

Basic philosophy

1. Purpose of life

The whole purpose of life is to have happiness. All of us strive for it, work towards it and deep inside feel that it is the ultimate goal. Different people have different definitions of happiness but ultimately, we all want it.

Happiness is a state of mind [1] and hence the purpose of life is to make mind happy. And mind becomes happy by maximizing its experience which is facilitated by the body since body provides inputs through the senses.

Maximization of experience is affected when brain absorbs information from the senses and creates neural pathways to form memories. This process takes place at the maximum rate during childhood when the brain is developing and also continues to happen for those whose brains remain nimble throughout the life. Thus, the brain is a sucker of experience! And we are what we think!

Since the information absorption capacity of the brain is the highest during the childhood proper education and guidance to children is of paramount importance. Educating children in the art of deep thinking and contemplation can enable them to produce minds which will remain supple and ever-expanding all their life.

Those brains which do not have the ability to gain new experiences, get petrified and signal the start of senile death which is normally a sign of old age. Nevertheless, there are quite a number of individuals who are active and curious even in old age and they are the most interesting people and a joy to be with.

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As the brain becomes bigger, as is the case of humans, more experience is required and acquired. This mind-expanding exercise is the genesis of wisdom since it gives a sense of perspective in life.

Also, the gaining of experience is very enjoyable, and this mind-expanding exercise brings happiness. The maximization of experience is also achieved by travel since the scenery changes and hence provides tremendous inputs to the brain. This is the reason why travel and especially travel to new places is enjoyable.

Experience gaining is also enhanced by curiosity. An active and supple mind is also a curious mind. The suppleness can be cultivated by being mentally active and can be enhanced by Yoga and meditation since it allows the expansion of neural pathways.

Another reason why we feel happy when absorbing experience is because a furiously absorbing mind keeps the psychological knots to a minimum. These knots are formed when in the absence of external experience, the mind goes in an ever-increasing internal spiral. The mind which gets enmeshed in psychological knots cannot expand itself and get happiness. The old saying of “small and petty- mindedness” probably came from this.

A supple mind which maximizes experience intake is also able to focus on a single thought for a long time. This is called Sanyam in Patanjali Yoga darshan. During this process of tremendous concentration, the **sense of time vanishes**. Time itself does not go away but the sense of time reduces or nearly vanishes.

It is this losing of sense of time that gives contentment and peace since anxiety is reduced. Anxiety emotion is about perceived fears and hence has time embedded in it. It may also produce a fear of losing something or missing out. A powerful mind which can analyze and process the

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information very effectively makes the time-sense disappear and hence reduces the sense of anxiety.

Why are our brains wired for maximum experience? A part of the reason is the large number of neurons in the human brain – about 100 billion, which forces the intake of information and hence the experience.

Another reason could be that the Universal consciousness can only experience through bodies of living beings and hence the proliferation of species and the need for maximization of experience through them [2].

So, let us all live a happy, fruitful, and energetic life by maximizing our experience. That is the whole purpose of life!

This article was published in October 2013. Another article recently published (April 2021) and expanding on this theme is here [3].



2. Art and Science of Happiness

All of us aspire to have a good life and happiness. There are as many definitions of happiness as there are people. But generally, people want a decent place to live, mobility, good education for their children, clean environment, a challenging workplace, good and wholesome entertainment, and enough money to meet their usual daily requirements. These are the issues around which the modern industrial societies have evolved and yet they have created the biggest problem of totally unsustainable lifestyles fuelled by greed. Thus, the climate change, economic meltdown and other consequent social problems are direct result of our greed for resources and energy. Hence the control of greed or better yet the sublimation of greed emotions into higher ones like humility and simplicity can lead to sustainability, happiness and a rewarding life.

Pursuit of happiness is the goal of all religions and almost all spiritual writings are about how to achieve it. Most of the religions have focused on renunciation and elimination of desire. Some use this to promise happiness in after life. However, one can find happiness in this life and world. Based upon the material in the previous chapters we will try to explore in this essay how one can lead a happy life by channelling our desires into fruitful avenues and by curbing or sublimating our greed impulses. All these strategies combined will lead us to a sustainable lifestyle.

Happiness

A young boy went to a Guru and asked him how he can see God. The Guru immediately saw that the boy was an enlightened soul but too young to be educated in the abstract knowledge of Vedas and Upanishads. He asked the boy whom he loved most. The boy replied “My calf. I play with him all the time. He is my true companion”. The guru asked the boy to think and meditate on the calf. After some months the Guru went to see what his young disciple had achieved and found him crying. “I am losing my mind”, said the disciple “The calf has become so small that it sits on my palm”. The

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guru advised the disciple to continue meditating on the calf. After some time when the Guru visited the disciple again, he was crying and said that now the calf has grown so big that it reaches the sky. Guru knew that the young disciple was on the correct path. He told him to continue further on the same path. Many years passed by before the Guru went to see his disciple. From the disciple's face the guru knew that he had obtained happiness and had reached his destination. After great difficulty he was able to shake the disciple out of his *Samadhi*. On being asked how he feels the disciple replied, "Sir, you, I, calf, sky and God are the same!"

Focus on a single thought or a desired object for a long time is the essence of yoga (called *Sanyam* in Patanjali Yoga) and produces tremendous happiness. Concentration on a single thought for a long time might help stimulate or "tickle" the pituitary gland and gives a sense of wellbeing.

Happiness is a state of mind. We feel happy and enjoy life through our senses and the mind. Brain processes the information from the senses and our level of happiness is dictated by its processing power. A powerful processor which produces deep thought can therefore extract more information from the sensory signals and hence can give us more happiness since the mind gets satisfied easily. A smaller processor obviously needs many more inputs to reach the same enjoyment or satisfaction level. Thus, weaker brains need more resources to occupy them, and this leads to greed and unsustainable lifestyle. Therefore, one of the prerequisites to having a sustainable lifestyle is development of a powerful and smart brain. Such a brain allows us to think deeply or concentrate during which we can get "lost" in processing that information.

A powerful brain or a processor also shifts the priorities in life and helps in shifting the focus towards getting personal happiness through mental peace and less on material needs. When concentration on single thought is done regularly and continuously for a long time then it takes our mind away from our insecurities and hence gives us a feeling of calmness and wellbeing.

The insecurity of human beings comes when they do not have anything to do. Thus, activities such as hoarding of wealth, material goods etc. are the result of a shallow mind. Mind seeks enjoyment and gets it in activities like binge shopping etc. A mind which is very powerful can find enjoyment within itself and makes a person self-contented and happy. Thus, the act of accumulation or hoarding of anything is a sign of a lower life form since it is driven by fear complex of losing out or not having enough.

An evolved human being on the other hand will try to hoard as little as possible and will possess only those material things required for his or her use and enjoyment. This is the essence of sustainability. Modern examples of evolved humans are Gandhi and Einstein who lived very simply and yet produced a very high quality of thought since they were very secure human beings.

Powerful brain

Geneticists tell us that we are born with a certain type of brain and that puts a limit on its processing power. However, any type of brain can be nurtured to work efficiently, and it is this capability that needs to be imparted to all children. Surely there will always be differences between brains but with proper nurturing during childhood the average capabilities can be raised very high.

When we are young our brains are powerful and pliable. Primarily this is because it is relatively free of memories and psychological knots. Besides there are lots of sex hormones flowing through them. These chemicals are necessary and useful for memory enhancement and hence in producing a powerful brain. Thus, to increase the brain capacity and have more focused thinking it is necessary that teenagers should be made to focus on various interesting things and less on sex. Too much sexual activity fritters these chemicals away. Probably this was the basis of celibacy propagated by all religions in different civilizations.

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Sexual abstinence is a very difficult thing to teach the teenagers. The evolutionary forces cause a tremendous hormonal flow in young people since procreation is the most important part of life. This hormonal flow should be utilized for making the brain powerful and should not be frittered away. Because of our hedonistic society we tend to create more sexual opportunities which sometimes result in overindulgence. This is disruptive and not very productive. Sex is enjoyable and when practiced among consenting adults in moderation is also good for human health. Therefore, it is difficult to curb the powerful sexual tendencies of the young people.

Sex desire should not be suppressed but should be sublimated. We can do this by inspiring the youngsters and making them work hard so that they do not have much time to think about sex and related things. An empty mind is a devil's workshop. This requires that parents and teachers create work environment for children which is challenging, interesting and physically taxing. A "soft" society leads to obesity and compulsive sexual disorders.

If we want to shield the children and young adults against the disruptive "too much sex" society then we must first put a reign on the behaviour of the adults. If adults want sex to be depicted openly in mass media, then it will automatically be seen by children. Nevertheless, it is very difficult to censor out sexual content since in an open society adults have the freedom to do whatever they want.

Thus, the ancient Indian schooling concept of 'Gurukul' becomes useful where the children were put in the schools and colleges in isolation and where the focus was on Yoga, learning and sexual abstinence. The practice of Yoga by children will help them to develop the power of concentration which ultimately can produce a powerful brain. Since the brain is pliable during the impressionable age, teaching of Yoga in schools should be made compulsory.

However, in the modern world this ancient Indian concept may prove

difficult to sell. Also, the teachers of such “gurukuls” must be very disciplined and highly evolved human beings. Presently teaching profession generally attracts only the lower strata of the society. Still, we can aim and plan for modern “gurukuls” which can be excellent schools with focus on Yoga, moral science and sports, besides the regular subjects. Creation of very intelligent children and young adults who will pass out from such schools is necessary for the betterment of society.

At the same time how do we create the conditions for us to think deeply and produce powerful brain? Today’s society does not put a premium on reading or thinking deeply on something. The pace of life together with information overload from TV, radio and other electronic media is creating a new generation of humans with very short time span focus [1]. Deep thought requires energy, application and will to achieve it. Short attention span does not require too much effort and hence is easy on the mind. However, if we consciously create in our children from very early age the desire to read which will help them cultivate the habit of imagination and daydreaming, then there is a chance of creating a society which is more focused and happier.

Children who have an active imagination daydream a lot. They create imaginary beings though fully conscious of the fact that they are make-believe entities. Sociologists have been baffled as to why children do this. A possible answer is that this is the origin of *Sanyam* in children. The brain of active children is very powerful and in the absence of any structured thought or focus, starts a movie of imagination. Once this movie is started then there is a continuous flow of thoughts in this direction and the movie gets bigger and bigger till it takes on a life of its own. Children do it because it is a genesis of deep thought and brings happiness to them. This daydreaming can only happen when the child's mind is not bombarded by external inputs, which in present-day electronically driven world is difficult to avoid.

Heightened awareness

Production of huge human brain is still an evolutionary mystery. Its big size cannot be explained by the pressures of evolutionary forces alone. I feel that it developed so that we can understand the universe and become aware of universal consciousness.

Hence hallmark of an evolved brain is that it becomes acutely aware of its surroundings and with its powerful processor is able to expand its horizons to encompass our world, solar system, and universe. This expansion gives us a tremendous sense of peace, tranquillity, and perspective on our life. This is the genesis of wisdom.

Also, the expansion of our horizons gives us an awareness of reality and life in different dimensions. This is the genesis of “God Sense” that each one of us possesses irrespective of our caste, creed or religion. It is possible that our brains have this in-built idea because this earth was seeded by an intergalactic civilization (this aspect is explored further in Chapter 54) and hence through ages we have carried that genetic code through our ancestors who were more aware than us of the reality of other planets and of higher dimensional space. In fact, as we evolve technologically and otherwise this awareness will become stronger and the boundaries between our four and higher dimensions will become blurred. This concept is also mentioned in Patanjali Yoga Darshan and the modern science and technology makes it possible to visualize it and probably experience it.

This awareness of higher dimensional space and reality can also make us fearless and remove our fear of death since death is a simple transition between various forms and dimensions. This is also the lesson of Gita. With fearlessness comes the ability to do new things and follow uncharted paths which can give us a quantum jump in our technological developments and understanding of natural forces.

Because we have roots of advanced galactic civilization hence the concept of

gods with superhuman powers and dazzling lights are embedded in our memories. So is the desire in us to travel intergalactically. However, with our present technologies it is not possible to do so. Presently the easiest and the most energy-efficient way to travel from one planet to another is via soul transfer [2]. This has been preached by almost all religions throughout the ages where reaching heaven after death was the goal of existence. I believe our ancestors understood that this was the easiest way to overcome gravity barrier [3] of earth and hence the focus on future births in heaven etc.

Our roots in intergalactic space also made us aware and focused on heaven and hell concept. Heaven was always the great place where we originally came from and probably must have been a very technologically advanced civilization. It is also possible that this was a place devoid of any physical or emotional pain.

As we become technologically advanced and become gods ourselves, we will eventually lose the “god” thought and become more tuned to making this world a heaven. Once that happens then we will talk less about heaven and future births and more about what is possible now and can be achieved. Also, we will have no problem in being born again and again on his earth and with our technology will become an inter-solar and intergalactic traveling civilization - just what the gods may have been.

Nature of Desire

It is possible that as we make our brains powerful and expand the boundaries of our consciousness, we may also desire more inputs and resources for it so that it can keep itself occupied. Thus, a powerful brain will channel the desires into new avenues which will benefit the humanity more rather than our greed. To do so we must however first try to understand the desire emotion.

What is the sociobiological basis of desire? Why do human beings have it and what is the nature of its fulfilment and that of unfulfilled desires?

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Desire manifests itself in different forms – lust, aim, ambition, control, goal, etc. However, the driving force is the same – power, fame and money and I think it ultimately boils down to control and hence power. Some also call it an ego trip.

Desire is fuelled by experience. A living being wants to experience the world. This is an inherent trait of all life forms. We are wired for experience. Urge for maximization of experience fuels the desire. Whether the desire is for sex, money, fame etc. it is driven by the same need to have experience.

As our brains develop (right from our birth) the neurons need to form the memory pathways. This process is accomplished by sensory perception where the inputs from the senses form the memory. We are hardwired to increase our experience and memories. This is the genesis of desire. Thus, desire and brain are interlinked. As long as brain exists there will always be desire.

One of the outcomes of desire is possession. We feel a need to possess whatever we desire whether it is a person, object or even an idea. This possession helps in maximization of experience. As we absorb this “experience” through our senses, our brain processes this information. It is during this process that we “decide” whether our desires are fulfilled or not. Fulfilment of desires therefore helps us in releasing the “possessions”. Thus, a powerful processor or the mind can get its desires fulfilled quite easily without physically possessing the objects of desire. While on the other hand a weaker brain needs to possess lots more things for fulfilling them and this leads to greed. Thus, to live a sustainable life it is necessary to have a powerful brain processor.

Desire is a useful and necessary emotion. It allows us to achieve something and be active. Without desire we will be lifeless, dead or like stones. However, what we need to do is to channel our desires so that they get fulfilled without too much taxing of resources, materials, and energy. For

example, a desire to invent a new process, to create a new thought or discovery does not require much energy or resources, say as that for possessing too many cars or luxury items like a 100 ft yacht or a private jet liner, etc! The desire for material goods which supply our needs and not our greed could be good for humanity at large and will lead to sustainability.

One of the possible ways to satiate the desire for possession of material goods is sublimating it via virtual reality (VR) tools [4]. As the technology for virtual reality systems evolves and VR becomes more realistic, we will be able to take care of most of our desires with very little use of energy and materials. This will hopefully lead us to sustainability.

Satiation of desire requires energy and materials resources, and excessive desire leads to greed and hence to unsustainability. The wisdom of “I” or ego keeps a check on the desires [5]. If not, then the mind goes into an ever-expanding spiral of greed and excesses. Unresolved desires produce memory knots or stresses which have the mechanism of always directing the brain to them and creating anger, frustrations and hence depression. This happens because the thought production is channelled or influenced by the existing memories. If the brain has more memory knots of unfulfilled desires, then the new thoughts will be cantered and focused around them leading to anger, frustration etc.

A stressed mind gets angry very fast. Anger is an emotion, which occurs when things don't happen the way we want. Thus, a mind which can coolly and calmly look at all the possibilities (deep thought helps do that) may have a better conflict and anger resolution capabilities than a shallow thinking mind. Thus, insecurity and anger may be related.

As explained in earlier chapters the power of the brain processor is increased by availability of its working memory. This can happen with cultivation of deep thought so that the dissolution of other memories and psychological knots takes place. As this memory increases the absorption

and digestion of inputs also get enhanced since the mind becomes hungry for more experiences and this increases our desires. As our desires increase both in quantity and quality the powerful brain/mind complex starts looking for higher purposes. This “mind opening” experience allows interaction of mind with external and higher dimensional knowledge space and allows us to access the existing information from it - the basis of probably most discoveries, inventions etc.

Life as a continuum

One of the by-products of the massive brain of humans is that we can play God. This means that we can change the tapestry of nature by our technology. Since each one of us has a limited time frame to live we have this arrogance that we should accomplish everything in our lifetime. This causes greed and ultimately misery. Nature also effects changes but those changes take place in geological time scale and after the systems are in dynamic equilibrium with the surroundings. Human mediated changes powered by greed do not allow the systems to remain in equilibrium with the surroundings. That is the reason for our creating problems with the environment and producing conflicts amongst each other.

However, if we consider that we are a continuum, i.e., we will continue on this planet earth for a long time in different life forms and that all of us will work together for the benefit of mankind, then the task at hand loses a lot of its urgency and time its immediacy. As individuals we have a free will and work for our own good but as a part of the whole mankind, we all move towards speeding up its evolution [6].

The only requirement for this scheme to succeed is for reincarnation to be a reality [7]. For people who do not believe in it then the above framework can create conflicts and problems.

If we believe in reincarnation, then the time stretches, and we get a better perspective on life. It causes all our actions to become focused on achieving

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the general good of mankind for its evolution on a large scale. With this perspective one also gets a global outlook, and the country boundaries vanish. And this is the essence of being a human. In a way the development of science and technology allows us to proceed in this manner though most of the times we are not guided by the principle of continuum. Nevertheless, the desire to leave a better world for our future generations is in effect the product of this idea. Still the issues of patents, technology and intellectual property control create hindrances in the free flow of ideas and technologies since our greed propels us to control them. The latter issue comes into play because of our insecurities which lead us to arrogantly focus only on our present lifetime.

Nevertheless, this behaviour cannot change overnight but will happen slowly and I feel that in another 100-200 years we as human beings will become more benevolent and sharing.

Thus, to live a happy and sustainable life we need to make our brain very powerful by Yoga and by conserving energies which are too often frittered away in unfulfilled desires and emotional knots. This process can also help us in curbing our greed impulse so that all of us can work together with the available resources to make this world a better place where each one of us can live a sustainable and emotionally satisfying life.

This article was published in July 2009.



3. Happiness is a state of mind

There are innumerable definitions of happiness. Everybody has their own definition depending on their outlook about life. For example, some get it from money, fame, or helping others while others get it by being close to their loved ones. Googling the word happiness produces close to 50 million results!

Irrespective of the inputs, happiness is a state of mind and when humans feel comfortable in their existence, happiness results. So, what is that state of mind which makes us happy? I will try to present in this essay the neurobiological basis of happiness.

When the whole mind concentrates on a single object for a considerable amount of time, we get a sense of wellbeing. This is called Samadhi according to Patanjali Yoga [1]. I am sure each one of us also have personally experienced episodes of happiness when we get completely engrossed in our work or do creative work which requires deep concentration. During this process, we even lose the concept of time. All great inventors and creative people have often said that they were so immersed in their work that they lost all concept of time and space.

Why does whole mind concentrating on a single positive thought give us a sense of well-being? Part of the reason could be that with huge processing power it can resolve all conflicts so that we are at peace with ourselves. Another reason could be that it is a mind-expanding exercise where our minds connect to the Universal Consciousness. Thus, all of us, when concentrating on a positive thought or an idea have knowingly or unknowingly connected to the Universal Mind resulting in happiness.

Similar things were also reported by people who took the hallucinogen LSD or other mind-expanding drugs. Recent research at Imperial College London has shown that fMRI of brains of volunteers taking LSD revealed that the

whole brain was connected during LSD episodes [2] and that such episodes gave great happiness to the users and a sense of connectedness to the Universe. This is similar to the state of Sanyam (according to Patanjali) [3] where contemplation, meditation and Samadhi work together on an object.

The true feeling of happiness also comes when we are not attached to anything including a person or an idea. Detachment helps in reducing the formation of psychological knots in the brain. Psychological knots are produced when brain is not able to resolve properly the mismatch between expectations and reality so that permanent neural pathways or memories are formed. The more such knots in the brain means less available processing power of the brain since such memories use up neural pathways. The concept of detachment leading to happiness is also described in Gita and Patanjali Yoga.

Most of the attachments come because of the desire to possess or own either an object or an idea. Possession gives us a sense of security and hence the need for it. A powerful brain is able to resolve every issue and thus reduces the desire for possession [4]. Desire for possession also comes from fear. For example, the fear of losing out if we do not possess something, etc.

Brain is a continuously active machine and based upon signals from senses and internal churning; there are constant makings and breakings of neural pathways. The numbers of neural pathways available for processing information increase drastically if we have less strong memories stored in the brain. Strong memories are based on emotional events. Generally, such events take place during childhood, in early years or are due to traumatic happenings. According to Patanjali these memories can be dissolved through the science of Yoga and by practicing Sanyam.

Some people say money provides happiness. That may be true since money allows us to take care of mundane things so that mind is not distracted and is able to focus fully on higher goals in life. However, money should be

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looked at as means to an end and not an end itself. This means that there should not be any attachment to money-a very difficult proposition but maybe helped by a powerful brain.

Absence of pain also leads to happiness. Recent researches done at Oxford University have shown that the centers for pain, both emotional and physical, in human brain, are located in dorsal posterior insula (front position of brain) [5] and at the same place where the seat of ego exists [6]. Thus, the pain management is directed by the ego so that the whole brain is focused for its alleviation.

State of happiness is a complex phenomenon but ultimately it is perceived by the brain and if we make our brain powerful through Yoga and meditation then it can resolve the conflicting issues and help us live a happy and emotionally satisfying life.

This article was published in February 2017.



Powerful Mind through Meditation

4. How to Meditate

In many talks I have given and in articles on meditation that I have written, quite a number of times the readers have asked about how to do meditation. Meditation has been practiced since antiquity and tomes have been written on it, the classical being Patanjali Yoga Darshan. So, there is nothing new that one can say about it, except that what I present is based upon my limited experience. I do hope some of the readers will find it useful.

Meditation is basically a focus on single thought for a long time. This is what Patanjali talks about in his Yoga Darshan. It could be a thought on any subject or object, for example even on a mundane thing like *samosa*! Patanjali describes deep meditation as *Sanyam* where contemplation, reflection, and Samadhi are brought to bear on single object or subject.

Shri. Ramakrishna, the Indian saint used to tell an interesting story on this. A young boy went to a Guru and asked him how he can see God. The Guru immediately saw that the boy was an enlightened soul but too young to be educated in the abstract knowledge of Vedas and Upanishads. He asked the boy whom he loved most. The boy replied “My calf. I play with him all the time. He is my true companion”.

The guru asked the boy to think and meditate on the calf. After some months the Guru went to see what his young disciple had achieved and found him crying. “I am losing my mind”, said the disciple. “The calf has become so small that it sits on my palm”. The guru advised the disciple to continue meditating on the calf. After some time when the Guru visited the disciple again, he was crying and said that now the calf has grown so big that it reaches the sky.

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The guru knew that the young disciple was on the correct path. He told him to continue further on the same path. Many years passed by before the Guru went to see his disciple. From the disciple's face the guru knew that he had obtained happiness and had reached his destination. After great difficulty he was able to shake the disciple out of his Samadhi. On being asked how he feels the disciple replied, "Sir you, I, calf, sky and God are the same!"

Hence any idea or subject if thought about for a long time (including samosa) can result in reaching God Head. The main thing is to focus on the object. Since the mind may lose interest on mundane things like *samosa* hence it is useful to pick an object or subject which one likes or is extremely interested in. That will help maintain the focus and keep the thought in the vision field.

Also, we should try to focus on positive things. Brain is a transmitter and receiver of thoughts and hence focus on negative thoughts or about harming somebody can bring negativity to one's mind and interferes in the process of meditation [1].

One can meditate at any place or in any position. Walking while thinking deeply about a certain subject is also meditation [2].

However, a good way to meditate is to sit in an upright position, close the eyes and think about the subject. Closing of eyes reduces a major external stimulus and helps in focusing the mind.

The mind initially will not remain focused for more than a few minutes. It starts wandering and gets influenced by noise and other external inputs. Hence the need for closing eyes and thinking.

When the mind starts wandering one needs to gently bring it back to the object of meditation. Never do it violently because the mind has the

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tendency to rebel against force! If one achieves this then it is a step in the right direction because bringing the mind back to focus itself means increased awareness. Initially a person will be able to focus for a few minutes, but when practiced daily the duration will start increasing and eventually one can easily meditate for a couple of hours at stretch.

In the initial stages if you meditate deeply for 10-15 minutes there is a tendency to go to sleep. This is because meditation is very relaxing and therefore sleep results. Hence it is necessary to meditate while sitting so that when you doze off the sleep reflex wakes you up. For older people who have difficulty in sleeping, meditation is a good way to induce sleep.

Thus, there is no holy, spiritual, or correct idea or subject to meditate on. Anything can be meditated upon except the negative things. It is the process of thinking deeply that matters.

As the meditation progresses the first thing a person will notice is that his/her concentrating power has increased. Secondly, overall mental health and general wellbeing results. There are a large number of scientific studies done all over the world telling about the benefits of meditation.

Meditation also has the benefit of removing memories. This is what Patanjali speaks of when he says that a Yogi can remove his/her *Sanskars* by Yoga. Focus on a single thought for a long time requires energy and forces more and more neural pathways to be used for the single thought. This releases the already stored memories in these pathways and allows the brain to increase its processing memory. This helps the mind to become like a crystal because most of the psychological knots are dissolved. However, this state of mind is achieved after meditating for a long time and comes after years of practice.

Meditation also helps against boredom. Boredom is a state of mind which is incapable of accepting new ideas and is not interested in accepting

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external inputs. With psychological knots being dissolved through meditation which results in increased neural pathways, the mind is hungry for more inputs and hence removes boredom.

Another interesting outcome of meditation is that one starts to remember dreams. All of us dream but when the brain is very active and has less psychological knots it remembers the dreams. Remembering of dreams in the morning and contemplating on them is very relaxing and helps in further reducing the psychological knots.

So, my dear readers there is nothing sacred about meditation. Anybody can do it. And as Patanjali has said a person goes into Samadhi as a fool and comes out as a genius!

This article was published in July 2013.



5. Origin of Thought and Consciousness – A Conjecture

Since time immemorial mankind has always wondered the origin of human thought and consciousness and where is it located in the brain. Some recent scientific discoveries may provide a possible answer.

There are various definitions of consciousness, but the most accepted definition is “awareness” [1]. When a being becomes aware of itself and its surroundings then it is a sign of consciousness.

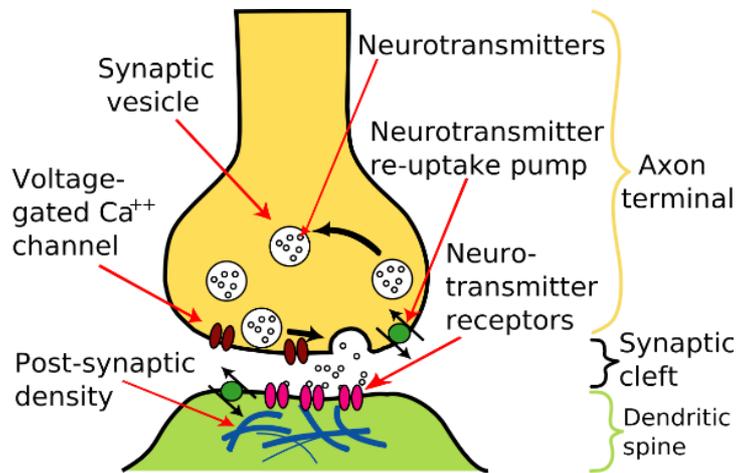
Awareness is an outcome of thought. It is the thinking brain that makes us aware of our existence and externalities. If we can understand what is thought and from where it originates in the brain, then we may shed some light on the mystery of consciousness.

It is an accepted fact that thought is produced when brain neurons fire [2]. There are close to 100 billion neurons in the brain (the exact figure is not known). For simple thought like what is the colour of flower, open the door etc. small portions of neurons fire but in deep concentration leading to *Samadhi* and *Sanyam* (combination of concentration and contemplation on a single subject or object) almost all the neurons fire to produce a deep thought [3,4].

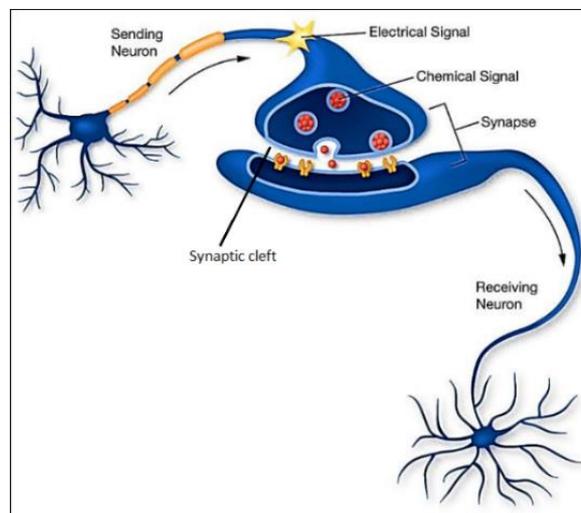
Activation of neural pathways trigger firing of neurons. This activation is triggered either by signals from sense organs or stimulation of certain memory space in the brain. Neural pathways help neurons to communicate with each other [5]. During this communication electrical signal from a neuron is converted into chemicals (neurotransmitters) and transmitted across the synaptic cleft to another neuron where it is again converted to electrical signal for onward journey [6].

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Synaptic cleft is a tiny space of about 20 nanometers (nm) between two neurons and is the place where the neurons exchange information via neurotransmitters (NT).



A neuron has three parts. At one end is dendrite which accepts NT from other neurons; the central nucleus which is the heart of neuron and a long nerve fiber called axon whose end (synapse) releases the NT for transmitting to other neuron.



Why did nature produce this type of communication system where the electrical signal from the neuron is first converted into chemicals (neurotransmitters), and transmitted through synaptic cleft and again converted back into electrical signal?

A possible answer could be that during this conversion in synaptic cleft photons are produced which are the signature of thought. This information

was discovered in late 2010s when scientists detected very low energy photons (in far infrared region) were being emitted during the firing of neurons and transfer of neurotransmitters across the synaptic cleft. Scientists are still not sure in what way brain uses these photons but speculate that somehow, they may help in increasing communication between various parts of the brain [7].

I conjecture that these photons from large number of neural pathways synchronize to form a three-dimensional hologram which we can call a thought.

The emerging science of synchronization might help to explain how photons might synchronize to form a thought [8]. This field emerged when it became possible to explain successfully how a very large number of fireflies start glowing in a synchronous manner in a short time after their random initial firing. Similarly, it also explained how large number of cells in heart synchronized to produce pumping action. Thus the synchronization of glowing fireflies, heart cells beating (peace maker) etc. are all outcomes of a spontaneous order by which a large number of similar objects or oscillators work or fire in unison to produce the desired end result.

These signals synchronize spontaneously since they are influenced by each other via a positive feedback-type mechanism. For example in case of fireflies this feedback is through their light signals where they adjust their phases so that they synchronize and in heart cells it is through mechanical coupling. In a similar way it is possible that the weak photons produced during firing of neurons synchronize and form a thought-hologram. This is the ***genesis of consciousness and internal awareness.***

The synchronization of weak photons is guided by an entity called 'I' (ego, will, etc.) which acts like a symphony director and helps provide the necessary energy and focus to maintain a given thought for a longer time [9]. Ego "I" also compares this thought constantly with signals from outside to

provide us a sense of reality. This is the ***genesis of surrounding awareness.***

We still do not understand completely how “I” can influence this process, but just like the music conductor who determines which part of the orchestra plays for how long, ‘I’ decides how long a particular thought will remain in the “vision” field [10]. This process is called concentration and seems to also exist in animals.

The production of weak photons for thought formation could also be the reason why many Yogis have experienced seeing white light during intense meditation [11]. Similarly the observation of white light by persons during near death experience (NDE) could be an outcome of nearly all the brain neurons firing during the final exit.

Since synaptic cleft plays a major part in thought production it is important that it is kept clean. It accumulates a lot of NT debris during the waking cycle.

The cleaning of cleft takes place during sleep when the cleft expands and the cerebrospinal fluid which floods the brain helps flush out the debris [12]. With inadequate and disturbed sleep the cleft starts getting cluttered with debris. Sleep deprivation in the long run may lead to dementia and other mental disorders since the neural pathways are reduced.

Memory resides in the arrangement of neural pathways firing. With strengthening of synapses in these pathways strong memories and a powerful brain results. Such a brain produces wisdom and happiness. That is what Patanjali has said in his Yoga Sutras.

Since the firing of neurons for a thought is from different parts of brain there is no single place where we can say that the thought originates. Thus, the consciousness exists but one is not sure where in brain it is. This is just

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like music which one can never say where it is but when played by musicians exists!

This article was published in February 2020.



6. Science of *Pranayam* and Homeopathy

Pranayam means control of *Prana* or vital force. According to sage Patanjali, it means controlled breathing which includes deep inhaling, exhaling and retention of breath [1]. *Pranayam* occupies central position in the Indian Yogic system, and it is said that liberation of soul is achieved through proper *Pranayam* and meditation.

Modern medical science has shown unequivocally that *Pranayam* helps in toning the mind and body [2]. However, the exact mechanism of how *Pranayam* helps in toning the body and mind has still remained a mystery. Recent research have shown that nanoparticles (particle size of 10-30 nanometers which are almost 10-20 times smaller than those emitted in cigarette smoke), can directly reach the brain through nose breathing and bypass the blood-brain-barrier (BBB). This process may throw some light on how *Pranayam* affects the mind and body.

Medical researchers discovered for the first time in 1941 that small amounts of fine particles that were inhaled through nose could be lodged in the brain by breaching BBB [3]. However, this field of research remained dormant till 1990s when scientists, alarmed by rising environmental pollution, revisited the early research and started discovering the harmful effects of toxin invasion of brain through breathing.

Today rapidly growing research shows that a small part of the air we breathe through our nostrils goes directly to the brain via the olfactory lobe and the rest (major portion) goes to the lungs supplying the necessary oxygen to the blood. Thus, the inhaling breath affects both the mind and the body directly. Moreover, the air we breathe has direct impact on our brain.

Scientists have also found out that breathing through one nostril affects the part of the brain on that side [4], and thus the practice of inhaling through one nostril during *Pranayam* is to stimulate that side of the brain and not

for cleaning the nostril as explained by experts in *Pranayam*. Similarly, deep slow breathing allows enough time for the nanoparticles or *Prana* to pass through the BBB and into the brain.

This has alarming implications for modern living since the inhaled pollution from household and automobile smoke, dust and general industrial environment has the ability to directly go to the brain and affect the nervous system. Incidences of increased cancer, dementia, Alzheimer's disease, etc., have been attributed partly to the toxin invasion of the brain caused by pollution. This could also be a possible reason why secondhand smoke is far more dangerous than smoking itself since the exhaled smoke particles go to the brain directly.

It has also been shown by the scientists that though the pollutants are most of the time flushed out of the lungs by the immune system, the toxic particles in the brain go on accumulating [5].

Nevertheless, if *Pranayam* is practiced in clean and open-air environment daily then it can negate the problems of modern life. A possible mechanism is explained below.

It has also been known for quite some time now that antibiotics-resistant bacteria get neutralized with fresh air and plenty of sunlight [6]. Researchers are finding that the enclosed environment of hospitals and offices with air conditioning and artificial air breeds bacteria which create diseases in the people residing in these buildings. Exposing them to plenty of sunlight and fresh air has brought down the incidence of disease drastically. A possible mechanism for this is that UV radiation of sunlight interacts with nanoparticles in air and produces free radicals and these reactive free radicals when inhaled have tremendous therapeutic value.

Thus, it is possible that the toxins in the brain can be detoxified by inhaling free radicals. Recently scientists have also found out that good deep sleep

helps in flushing out the toxins from the brain [7]. Since deep sleep is like meditation hence detoxification through *Pranayam*, good sleep and meditation can be a basis of healthy brain [8].

In the mountains the proportion of UV rays in sunlight is higher than in the plains and with higher altitude and less pollution the creation of free radicals also increases. Thus, mountain sojourn has always been recommended for improving health. Probably that could also be a reason why *Rishis* and *Yogis* went to mountains for meditation and practicing Yoga.

One of the most important part of breathing is smell. It is perhaps our most memory-evocating sense. The smell signals from the nose go directly to the limbic system-the seat of emotions. Thus, smells evoke deep emotional responses and memories.

Studies have also shown that fragrance can change moods and influence judgment [9]. That could possibly be the reason why throughout the ages, humans have always had a love affair with flowers and their fragrance. Beautiful flowers are not only balm to our eyes, but their fragrance is food for our soul. No wonder fragrance and perfume is 30-35 billion dollars [10] strong industry today. Use of mood enhancing incense has been used in religious practices in almost all societies through immemorial times.

Thus, the clean crisp mountain air with a whiff of pleasant smell from flowers literally evokes the abode of gods since *Pranayam* in such an environment provides the mechanism for detoxifying and cleaning the brain for better meditation and hence liberation. Even in our daily life, we can do *Pranayam* in open and clean air.

Scientists are also using *Pranayam* pathway for developing brain drug delivery systems through the nasal sprays so that it can breach the BBB and go directly to the brain. It is quite possible that this may explain how homeopathic systems of medicine works.

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Generally homeopathic medicines are given in the form of small globules which a patient is supposed to suck. Through sucking of pills a small part of the medicine reaches the brain via the olfactory lobe. This helps the brain to trigger the mechanism by which body releases chemicals to fight the disease. That is why the best way to administer the homeopathic medicines is to spray the liquid directly on the tongue since this allows rapid transfer of the particle mist to the brain via the olfactory lobe. Also, homeopathic medicines are supposed to be taken half an hour before or after food consumption so that the food smells do not interfere with the aroma of medicine.

Another interesting aspect of homeopathic medicines is that their potency increases with increasing dilution. There are conflicting reports on why this happens. I feel that increased dilution of medicine allows the BBB to be breached with relative ease resulting in its enhanced effect in the brain.

Thus, *Pranayam* acts like enhanced homeopathy where the free radicals from clean air help detoxify the brain and body for healthy living.

This article was published in January 2014.



7. Nature of White Light during deep meditation

When Vivekananda first met his guru Shri. Ramakrishna he was thoroughly probed and tested by Shri. Ramakrishna about his yogic karma [1,2]. One of the things that Vivekananda told Shri. Ramakrishna was that just before he went to sleep, he used to see white light.

There are hundreds of examples of advanced yogis who have reported seeing white light in deep meditation and being immersed in it. Similarly, there are large numbers of examples of psychedelic drug-takers who have also reported and written about seeing brilliant white light during their “trip”.

Such experiences have also been reported by large numbers of people who have gone through the near death experience (NDE) [3]. They have reported, irrespective of their religion and faith, seeing brilliant white light and having out of body experience (OBE).

What is the nature of this light? Is it an internal manifestation of brain or something external? Recent research in the science of neuron communication may throw some light on it.

Neurons communicate with each other via electrical signals which pass from one neuron to the other via axons and dendrites (wires of brain). The activity of a large number of neurons firing and sending signals through these brain wires produces thought.

Recently scientists have also discovered that information between neurons is passed by mechanical pulses in axons and dendrites [4] and via light. Nature uses all the forces at its command and since all these three mechanisms exist, they are used in neuron information transfer.

It has been recently discovered that neurons also communicate via light [5]. The light or photons are produced when neurons fire. The exact mechanism

on how they are produced is still not known but they vary in wavelength from 200-1300 nanometers which corresponds to ultraviolet (UV) to far infrared (FIR) radiation. Thus, large number of neurons firing can produce white light.

The light produced by neuron-firing is transmitted through axons and dendrites which behave like optical fibers. Scientists estimate that they can transmit anywhere between 50-96% of the light incident on them [6]. Transfer of information among neurons via light could be the basis of brain's high-speed reaction and processing.

There are close to 100 billion neurons in the human brain. These neurons are connected to each other via dendrites, axons and also to glial cells. The total connections therefore number between 500-1000 trillion [7]. Each connection is capable of producing photons during its firing.

Scientists have also estimated the rate of photon production by doing experiments on rat's neurons and then extrapolating the results for human brains. The photon production rate was developed for a very "quiet" neuron. This rate was then multiplied by the total number of connections to give a photon production rate close to 10 trillion/second [6].

In human brain specially during deep meditation the frequency of neuron firing is about 100 times that of "quiet" brain and gives rise to Gamma brain waves [8]. This can produce close to 1000 trillion photons/second and could be the source of the bright light reported by yogis and psychedelic drug-takers.

Data from brain scans reveal that psychedelic drugs work by depressing the brain areas which give rise to ego [9]. Besides they also help increase the connectivity in other parts of the brain. Thus, these drugs allow the whole brain to work together which results in melting of boundaries between self

and the world. These effects are very similar to those observed in *Samadhi* [10] or deep mediation.

Samadhi also dissolves the ego and focus on a single thought for a long-time results in *Sanyam* which allows all parts of the brain to work together. This results in experiences where the yogi feels that he/she has melted into Universal Consciousness. The major difference between the experiences from psychedelic drug and meditation is that the former cannot be controlled whereas experiences from meditation and *Samadhi* can be.

Advanced Yogis and psychedelic drugs-takers have regularly reported the life changing experiences after seeing and being submerged in white light. They feel a sense of oneness with the world and the universe and a belief in inter-connectedness of everything. Similarly in NDE scientists have recorded Gamma brain waves indicating a very high level of brain activity similar to that during *Samadhi* and hence the vision of white light and spiritual experiences [11].

Thus, such spiritual experiences are not because of light but because of the production of superfast and powerful brain which produces *Sanyam* and hence gets the knowledge about the Universe. The brain during *Sanyam* and to some extent under drugs is firing on all cylinders. Light is simply a by-product when all neurons are working and firing in unison. It is as if when one reaches the state of *Samadhi* then the light production tells the brain that it has been attained!

This article was published in May 2018.



8. Samadhi as a Soliton Wave

I have always been intrigued by the experience of the great Indian saint Shri. Ramakrishna who remained in Samadhi for almost six months [1]. Fortunately, his lay disciple took care of his bodily needs by forcibly feeding him and taking care of him otherwise he would have died. Shri. Ramakrishna later on said that he was oblivious to the outer world during this time. In the modern parlance this state would be comparable to that being in coma. Yet he was not brain dead but in higher state of consciousness.

So, what makes the brain achieve such a state that one gets locked in a thought – in this case higher consciousness for a long time? Modern theory of soliton waves may explain such a state [2].

Soliton is a wave which can remain stable for almost infinite time. These waves have been observed in liquids, gases, optics and even in space and arise because of the non-linearity of the wave phenomenon. The word Soliton is apparently derived from solitary wave which being stable almost acts like a particle. Hence soliton rhymes with electron!

When one throws a stone in a lake or a pond the waves produced in water soon dissipate and die off. However, in a turbulent lake or sea when there are lots of waves being produced the conditions sometime become ripe for a soliton wave to be formed which can remain stable and travel to great distances without dissipating. Such “rogue” waves have been observed in seas and have been the cause of major shipwrecks [3].

Human thought which results because of the firing of neurons in a certain neural pathway is also a non-linear wave [4]. The thought arises because of inputs from senses and its interaction with the stored memory in the brain. However, for majority of people these thought waves arise and dissipate in

rapid succession and result in brain chatter. This is similar to the waves produced by stone being thrown in a lake.

In meditation and when working on a certain problem with deep concentration, the ego 'I' can force and sustain a thought on a subject for a long time. With discipline and practice this time can be increased and ultimately leads to *Sanyam* that Patanjali in his *Yoga Darshan* talks about in which concentration, meditation and samadhi are brought together on to a subject. This *Sanyam* results in mastery of the subject and in the third chapter (Vibhuti Pad) of *Yoga Darshan* Patanjali talks about how a Yogi can get supernatural powers by doing Sanyam on various subjects.

Yet in all these meditative processes 'I' or ego remains. Ego or 'I' is like a director which helps in concentration and makes the brain keep a certain thought in the vision field [5].

However, in certain circumstances when the concentration becomes really intense so that there is a tremendous non-linearity in the system, suddenly a soliton wave of thought can be formed which renders 'I' or ego useless and could be the mechanism of remaining in the state of Samadhi for a long time or even forever. This was probably the state in which Shri. Ramakrishna stayed for six months. And he said many times that all his ego, 'I', awareness vanished during this Samadhi.

I also feel that it is this soliton thought wave that may be responsible for *Mahasamadhi* of great rishis and enlightened souls by which they could leave the body at will. It is as if the physical structure of brain and the body is required to reach the stage of highly non-linear thought and once the soliton is achieved the body's function is over and the liberation of being from cycle of birth and death results.

This article was published in August 2013



9. Meditation is Elixir of Life

In 2011 Luc Montagnier – the French scientist, who received the 2008 Nobel Prize in medicine for the discovery of HIV virus, experimentally showed that it was possible to replicate and transfer DNA strands from one test tube to another by simply passing a very low-level electromagnetic (EM) radiation of 7Hz through them [1,2]. This is almost like teleportation of life and, if proved correct, could be one of the most revolutionary discoveries of modern times.

Body is repaired, rejuvenated, and kept healthy by production and replication of good DNA. Any mutation or breakup of DNA leads to cancer and other ailments.

Also under deep meditation, brain produces EM waves called theta and alpha waves ranging from 4-12 Hz but mostly in the range of 7-8 Hz [3]. It is therefore possible that deep and regular meditation helps in rejuvenation of the body by helping replicate good DNA. In Patanjali Yoga, it is written that “By *Sanyam* or deep meditation on the elements, a Yogi gets a perfect body of beauty, grace, strength and hardness of a thunderbolt”. Meditation is like an elixir of life.

Deep meditation is basically focusing the mind on a single thought for a long time. Patanjali describes it as *Sanyam* or a combination of contemplation, meditation, and *Samadhi*. He says that when all these three things are brought to bear on any object, its complete mastery results.

Recently some more scientific studies have shown the direct effect of meditation on DNA and gene expression. For example, a study has shown that meditation helps in delaying the process of ageing by increasing telomerase activity [4]. Telomerase is an enzyme which repairs the DNA. Chromosomes have caps of repetitive DNA called telomeres at their ends. Every time cells divide, their telomeres shorten, which eventually prompts them to stop dividing and die. This results in the ageing process. However,

telomerase enzyme stops the shortening and meditation helps in increasing the activity of this enzyme.

Similarly another study done at Harvard University showed that meditation directly affects genes by switching them on and off so as to combat the bad effects of free radicals which are produced when we are emotionally and physically stressed [5].

All these studies have shown experimentally the positive effect of meditation at the cellular level in human body though the exact mechanism is still not known. I feel Luc Montagnier's work of low-level 7 Hz EM waves affecting the replication of DNA may hold the key to this puzzle.

Similarly, during the dreaming process the brain produces 4-7 Hz Theta waves [6]. Sleep and dream research has shown that deep sleep and dreaming is very necessary for our wellbeing and helps us in consolidating our daytime memories and also in removing some of the frivolous ones [7]. However, it is quite possible that besides the memory consolidation, 4-7 Hz EM waves may also help in rejuvenating the body and mind by enhancing the replication of DNA.

In the DNA teleportation experiment Luc Montagnier also showed that DNA template was teleported from its dilute solution in a test tube to another one containing only water [8]. In effect it showed that low-level radiation of 7 Hz produced a memory in water which matched the DNA molecule. Water with its unique weak hydrogen bond capability can form almost infinite number of structures and it seems the low-level radiation simply helped in this process.

This ability of water to form “memory structures” under external influence could also be the basis of *achaman* ritual. *Achaman* – a ritual of sipping water after reciting Vedic mantras is supposed to have therapeutic effect on its practitioner. It seems that chanting of mantras creates a “memory

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structure” in water. This is almost like the homeopathic medicine where the high potencies do not have any original medicine in it but the “memory structure” of the medicine persists in water [9]. *Achaman* may be acting like homeopathic medicine!

Meditation has been practiced through ages in almost all religions and its therapeutic value on calming the mind has been well known, but the recent discoveries show that it also affects the body at cellular level and hence is a true elixir of life.

This article was published in April 2011.



10. Detoxification of brain through Kapalbhati

Kapalbhati is a part of *Pranayam* kriya where one forcefully exhales rapidly and in short bursts. Practitioners claim that it helps in cleaning lungs and in exercising the abdomen muscles. It is therefore recommended for reducing tummy fat.

This exhalation exercise can be practiced by either sitting cross legged on the floor or even in a chair. The air is exhaled forcibly and in short bursts. This process is further helped by thinking that by exhaling this air one is cleaning the brain of its pollutants. The reflex action of this forceful exhalation then tones the abdomen muscles and also cleans the lungs. Generally, 30-50 short burst exhalation in one sitting is good enough exercise.

The word *Kapalbhati* means skull illumination! Yogis claim that practicing it cleans the brain and gives shining quality to a person's appearance. Modern science may give credence to this claim.

Recently researchers have shown that nanoparticles (particle size of 10-30 nanometres which are almost 10-20 times smaller than those emitted in cigarette smoke), can directly reach the brain through nose breathing and bypass the blood-brain-barrier (BBB) [1].

Medical researchers have known since 1941 that small amounts of fine particles that were inhaled through nose could be lodged in the brain by breaching BBB. However, this field of research remained dormant till 1990s when scientists, alarmed by rising environmental pollution, revisited the early research and started discovering the harmful effects of toxin invasion of brain through breathing.

Today rapidly growing research shows that a small part of the polluted air we breathe through our nostrils goes directly to the brain via the olfactory

lobes (this is the area which gives us the sense of smell) and the rest (major portion) goes to the lungs supplying the necessary oxygen to the blood. Thus, the action of inhaling affects both the mind and the body directly.

Medical researchers have also shown that though the pollutants are most of the times flushed out of the lungs by body's immune system the toxic particles in the brain go on accumulating.

This has alarming implications for modern living since the inhaled pollution from household and automobile smoke, dust and general industrial environment can directly affect the nervous system. Recently scientists have shown that incidences of increased cancer, dementia, Alzheimer's disease, etc., have been attributed partly to the toxin invasion of the brain caused by these pollutants [2].

Similarly it is quite possible that COVID-19 attack on various organs of the body could be mediated by the virus slipping into the brain through the olfactory lobe and attacking the brain. This makes the brain go into overdrive and sends signals to create a Cytokine storm resulting in attacks on organs like kidneys, heart, gut, etc [3].

There are however indications that some of these small particles might be flushed out by the cerebrospinal fluid which floods the brain. During the dreaming episodes this flushing mechanism is very active. However not all the particles leave the brain and hence affect the brain functioning.

Since these small particles go into the brain through the olfactory lobe it is quite possible that they could be flushed out by the forceful exhalation of *Kapalbhati* process. This follows the principle of equivalence.

The forceful exhalation creates a venturi effect in the nasal passage thereby creating a partial vacuum which might suck out these particles from the olfactory lobes. Natural designs are very efficient and consider all paths and

forces. Thus, the forceful exhalation of breath not only exercises the abdomen muscles but also cleans the lungs and the brain. This cleaning of toxins from the brain is the true meaning of *Kapalbhati*.

For people living in the present polluted atmosphere a good strategy would be to wear a nose mask which filters out the pollutants during outdoor activities and practice *Kapalbhati* daily to remove the particles which inadvertently might have gone into the system.

Naturally it is preferable if we reduce the pollution in our cities so that the air becomes clean. Then the loading of brain with pollutants can be drastically reduced.

This article was published in August 2018.



11. Meditation can help douse the body fires

Inflammation is the body's first line of defense. Anytime we have disease or injury, body heals it by producing inflammation. Increase in blood flow and white cells at the injury site produces redness, swelling, heat and pain. Inflammation is therefore like a fire burning inside the body [1].

Stress which causes emotional pain also induces inflammation and sets off the same chain of events as infection or injury. Thus, emotional, and physical pain have similar characteristics and affect the body in a similar way.

One of the biggest causes of inflammation in body is obesity which is a result of modern-day lifestyle caused by poor eating habits and stress. Body fat stores large quantities of cytokines – a chemical which allows increased blood flow to inflamed parts of the body and helps in triggering the immune system to fight the disease. Large amount of body fat allows cytokines to seep out and produce low level inflammation. Scientists believe that fat in large amounts is an inflammatory tissue [1].

Most of the times inflammation is automatically doused by body healing itself. However sometimes the switch which helps in shutting it off goes haywire. This leads to chronic inflammation and can sometimes lead to cancer. Inflammation caused because of stress and emotional pain takes longer to heal.

Chronic inflammation whether strong or of low level affects the brain and leads to depression. Many of the classical symptoms of inflammation like tiredness, malaise, loss of appetite and waning interest in things look a lot like depression. It seems that with inflammation and pain the whole brain is focused on resolving it and with time this process slowly starts zapping the energy resulting in loss of interest.

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Till recently this interconnection between inflammation and depression was not known and so the psychiatrists used to treat depression by giving patients antidepressant medicines (based on trial and error) but somehow it often did not help. A chance discovery of the use of psychedelic drug psilocybin (a key component of magic mushroom) to treat depression also resulted in finding a cure for inflammation [2].

This clearly established the mind-body connection and showed the principle of equivalence where cause and effect are interchangeable. Thus, inflammation led to depression and cure for depression also cured inflammation.

Psychedelic drugs work by depressing the areas in the brain which give rise to ego [3]. Besides they also help increase the connectivity in other parts of the brain. Thus these drugs allow the whole brain to work together which results in melting of boundaries between self and the world [2]. These effects are very similar to those observed in *Samadhi* or deep meditation [4].

Samadhi dissolves the ego and focus on a single thought for a long time results in *Sanyam* which allows all parts of the brain to work together [5]. This results in experiences where the yogi feels that he/she has melted into Universal Consciousness. The major difference between the experiences from psychedelic drug and meditation is that the former cannot be controlled whereas experiences from meditation and *Samadhi* can be.

Inflammation message from the body to the brain is transferred through blood via the release of certain chemicals produced during pain. The reverse information – from brain to the inflammation zone, I feel, is transferred by the vagus nerve [6]. Vagus nerve is the information highway of body which passes messages to and from the brain to different parts of the body.

Though the exact mechanism of how the psychedelic drugs help in reducing inflammation is not known, but scientists have recently discovered that after

taking the drug some receptor molecules are released both in the brain and in different parts of the body and which help in fighting inflammation [2]. Just like 3D printing, it is quite possible that vagus nerve transmits the design template of receptor molecules to the place of inflammation where it is produced. The raw material for production of such molecules exists all over the body.

Scientists have also discovered that inhalation of a very small number of psychedelic drugs can have a dramatic effect both for curing depression and inflammation. Inhalation allows the drugs to be transferred directly to the brain via the olfactory lobe – which lies above the nose and the low potency of medicine shows that it works like homeopathic medicines [7].

Patanjali in his yoga darshan clearly states that yogic powers can also be obtained by the use of drugs [8]. This is probably the first such reference anywhere regarding the use of psychedelic drugs for mind expansion and helping the body.

Thus, the stress of modern life which fuels inflammation causing pain and misery can be cured by meditation and *Sanyam*. It can douse the body fires leading to healthy mind and body and creates happiness.

This article was published in May 2018.



12. Meditation may help Alzheimer Disease

Dementia, Parkinson's, and Alzheimer's disease (AD) are diseases of the brain (DOB). They basically degenerate the nerves, attack central nervous system, make people forgetful and ultimately make them lose their memory completely so that they cannot recognize even their near and dear ones. DOB are generally old age diseases which mostly happen after the age of 60-65 though in some cases they can start as early as 40-45. Thus, the old derogatory Hindi saying "*sathiya gaya hai*", meaning after 60 years he has become senile, is normally used when calling somebody a dim wit! As we age the chances of getting DOB increase.

Present estimates are that 50 million people worldwide and nearly 6 million in India above the age of 65 years suffer from these debilitating diseases. With stress the onset of DOB comes at an even younger age and hence in India the number of people suffering from these diseases may even be larger.

Many studies done by scientists have shown that intellectually active adults suffer less from these diseases as they age. And one of the better ways to increase mental faculties is by meditation. It allows us to focus on a single subject for a long time and increases the concentration, mental sharpness and brings in general feeling of wellbeing and happiness.

Various theories of why DOB take place have been proposed. One theory states that formation of plaques in the brain damages the neurons and ultimately destroys the brain. According to this theory clumps of misfolded protein fragments called amyloid-beta or $A\beta$ form plaques around synapses – the connecting points between neurons.

This stops the communication between them since no neurotransmitters can flow across the synapse and hence the loss of memory. Why $A\beta$ - a good

brain protein misfolds and forms plaques, though has still remained a mystery.

Another theory states that plaque formation in brain takes place because of reduced number of cerebral capillaries. These brain capillaries, which are very large in numbers, supply important nutrients, oxygen and hence energy to different parts of the brain for its proper functioning. With age and less usage, the capillaries become hardened, less pliable, and hence less amount of nutrients flow through them. Thus, their effective numbers decrease. Nevertheless, the research does not show how reduced number of capillaries can increase plaque formation.

A possible answer to both the riddles of why plaques form from misfolding proteins and reduction in number of capillaries could come from electrochemistry.

It is well known that when a fluid flows in very small capillaries (brain capillaries are approximately 3×10^{-6} m (3 μ m) in diameter) a small voltage is created across it. This is called the streaming potential. This small voltage also produces a micro current and it is possible that this micro current creates disturbances so that seeding and accumulation of A β proteins does not take place. The use of micro current for stopping rust in pipes and other materials is quite well known. And it is quite possible that a similar process may be taking place in the brain.

Incidentally the streaming potential from brain capillaries together with electrical discharges at synapse junctions between communicating neurons, produce the characteristic electromagnetic (EM) signature of the brain. It is measured by hundreds of electrodes attached to the scalp and produces the well-known EEG (Electroencephalography) of the brain.

As we use our brain it needs energy to function and that is provided by the flow of nutrients and oxygen in the cerebral capillaries. Larger number of

capillaries means increased nutrient flow to the neurons which helps them to communicate efficiently. The more deeply we think and use our brain the more flow of nutrients takes place, and this helps in increasing the effective number of capillaries and keeps them functional and in nimble shape. At the same time the micro current production in them keeps the plaque formation at bay.

Deep thinking is facilitated by cultivating the art of meditation. Meditation, as we have noted earlier, is nothing else but focusing the mind on a single thought for a long time. When done regularly this method makes majority of neurons in the brain fire for a single thought and is called *Sanyam* in *Patanjali Yoga Darshan*.

The firing of majority of neurons increases the activity across the synapses and hence may not allow A β proteins to accumulate at or near them. The old saying that “unused brain rusts” may be true because inactive neurons may allow the plaque buildup at the synapse.

Meditation can be done at any age but if it is practiced from an early age then it makes the brain nimble, and many capillaries become active and remain so throughout life.

This article was published in June 2013.



13. Chanting could reduce risk of Alzheimer's

Recently scientists at MIT, USA have discovered that exposing mice to 40 hertz light signals and sound waves remove the plaques in their brain [1]. These plaques are the cause of Alzheimer's and other brain diseases that reduce our memories.

When the brain is under deep meditation or concentration, gamma waves are produced [2]. These waves range anywhere from 25-100 hertz but have an average frequency of 40 hertz. Many studies on meditating yogis' brains have revealed that these waves are produced under deep meditation and concentration. On the other hand, deep sleep produces delta and alpha waves that vary from 4-12 hertz.

Neurons and memory

Alzheimer's disease is a disease of brain where clumps of misfolded protein fragments called amyloid-beta produce plaques around synapses – the connecting point between neurons [3]. These plaques stop neurons from communicating, thus destroying memory. Nobody knows how these plaques are formed and world over research is being conducted on how to remove them. As the world's population is ageing, more research is being carried out on Alzheimer's and other brain diseases that affect mostly the elderly population.

Ancient Indian system of meditation and chanting Sanskrit shlokas and hymns may provide a possible solution for reducing risk of Alzheimer's.

Scientists have recently discovered that people who chant Sanskrit shlokas have better memory [4]. There is speculation that continuous chanting of shlokas requires memorising them a lot and it helps in memory improvement and consolidation. It is just like memorising arithmetic tables that all of us old-timers were taught when we were kids. It is also

conjectured that people with better memories have less chance of getting Alzheimer's and other brain diseases.

Mantra vibrations

The nasal and sonorous sound of proper recitation of mantras creates vibrations inside the brain that increases the probability of producing 40 hertz brain waves. Since both auditory and visual cortex, where sound and light signals respectively are processed, are in a certain section of the brain, we still do not know the exact mechanics of how such sound waves create 40 hertz for the whole brain.

Some scientists speculate that the hippocampus, which is the memory region of the brain, is positively affected by this chanting [4]. Hippocampus is the first region of the brain affected by plaques. If plaque reduction in this region can be affected, then this cascading effect can be felt in other areas also.

The Aum sound

This could also be a possible reason why chanting of "Aum", which has nasal tone, may have been suggested in our ancient texts as a means of meditation. Besides chanting shlokas also helps in meditation since it focusses the brain on this activity.

Patanjali clearly mentions in his yoga darshan that repeating this mantra produces knowledge of Universal consciousness and destroys obstacles to that knowledge. Naturally the word mentioned in Yoga Sutras is Pranava (the original word) which could be the "Brahm Naad". Yogis believe that this deep hum, which is close to 40 hertz, is the Brahm Naad

This article was published in August 2018.



Emotions and their Resolution

14. Nature of Desire and its resolution

Basis of life is desire. According to Rig Veda, Universe came into being when “It” desired so? When there is no desire there is no life [1].

Hence the old Indian tradition of saying that one should stop or reduce desire or that desire is the root cause of all evils is wrong. When there is no life of course there will be no evil! So, a life with all its darts and farts is much better than no life!

Human desire manifests itself in different forms – lust, aim, ambition, control, goal, etc. However, the driving force is the same – power, fame and money and I think it ultimately boils down to control and hence power. Some also call it an ego trip.

Desire is fueled by experience. A living being wants to experience the world. This is an inherent trait of all life forms. We are wired for experience. Urge for maximization of experience fuels the desire. Whether the desire is for sex, money, fame, etc. it is driven by the same need to have experience.

As our brains develop (right from our birth) the neurons with inputs from senses need to form the neural pathways. Brain is an autonomous organ and there is a continuous energy and material flow into it for making and unmaking neural pathways. These neural pathways then form memories and hence desires. Thus, memory formation forces experience gathering. This is the basis of desire. Therefore desire, memory and brain are interlinked. As long as brain exists there will always be desire.

One of the outcomes of desire is possession. We feel a need to possess whatever we desire whether it is a person, object, money or even an idea. This possession provides an anchor for the experience and helps in its

maximization. As we absorb this “experience” our brain processes this information. It is during this process that we “decide” whether our desires are fulfilled or not.

This decision is a function of the power of the brain. Thus, a powerful processor or mind which can coolly and calmly look and evaluate all the possibilities can sometimes get its desires fulfilled without physically possessing the objects of desire. Fulfillment of desires therefore helps us in releasing the “possessions” and is the genesis of detachment or contentment as preached in most of the religions of the world [2]. This process gives us tremendous sense of peace, tranquility and perspective in our lives and is called wisdom [3].

While on the other hand a weaker brain with small memory needs to possess a lot more things for fulfilling them and this leads to greed and corruption. Thus, to live a sustainable, fulfilling, and holistic life it is necessary to have a powerful brain processor.

Desire is a useful and necessary emotion. It provides the engine for evolution and achievement [4]. Without desire we will be lifeless, dead or like stones. However, what we need to do is to channel our desires so that they get fulfilled without too much taxing of resources, materials, and energy. Also, we need to create desires for higher and noble things. This will create happy memories, a fulfilling life and contentment.

Unresolved desires produce memory knots or stresses which have the mechanism of always directing the brain to them and creating anger, frustrations and hence depression. This happens because the thought production is channeled or influenced by the existing memories. If the brain has more memory knots of unfulfilled desires, then its working memory gets reduced and the new thoughts get centered and focused around these knots leading to anger, frustration etc.

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A stressed mind therefore gets angry very fast. Anger is an emotion, which occurs when things don't happen the way we want. Thus, lack of possession, loss of control, etc. fuel anger. A powerful processor or mind through wisdom may have better conflict and anger resolution capabilities than a shallow thinking mind. Thus, insecurity and anger may be related.

One of the possible ways to satiate the desire for possession of material goods is sublimating it via virtual reality (VR) tools [5]. These high-tech tools which are like 3D video games like aircraft simulation systems allow the mind to have an enhanced experience without physically possessing the objects of desire. Nevertheless, the resolution of desire knots via this tool requires a powerful mind to analyze, resolve and dissolve them.

These desire knots not only have to be resolved in our brain, but their memories have to be removed from the Knowledge Space (KS) as well [6].

Just like memory and material removal from our computers is not the end of a person's presence in the cyber world (it has also to be removed from cyber space as well); so the memories of the desires have to be removed from KS also for achieving liberation from the cycle of death and birth.

As Patanjali has said that when the sanskars (Karma, memories, desires, etc.) are resolved they have no role to play in a person's life and then he/she achieves Kaivalya or Nirvana.

The power of the brain processor is increased by availability of its working memory. This can happen with cultivation of deep thought so that the dissolution of other memories and psychological knots takes place. As this memory increases, the absorption and digestion of inputs also get enhanced since the mind becomes hungry for more experiences and this increases our desires.

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As our desires increase both in quantity and quality the powerful brain/mind complex starts looking for higher purposes. This “mind opening” or God experience allows interaction of mind with external and higher dimensional knowledge space (KS) and allows us to access the existing information from it - the basis of most discoveries, inventions, etc. In doing so it gives us happiness and contentment [4,6].

This article was published in 2010.



15. What is Ego and how to Tame it

Since time immemorial humans have been intrigued by the idea of who am I or the nature of ego, 'I', etc. Philosophical and psychological tomes have been written on it. One of the tenets of Indian philosophy is to reduce or eliminate the ego so that liberation from cycle of birth and death takes place.

However, very few have been able to identify what ego, 'I', etc. is, and where in brain it is located. Modern science and discoveries in brain research may be able to provide a possible answer to this riddle.

Recently scientists have been able to identify a small part inside the frontal portion of brain as the seat of ego, consciousness, and sense of self. According to them in the areas called Anterior Cingulate Cortex (ACC) and Fronto-insular Cortex (FIC) lies the sense of ego or awareness [1].

In these areas are also found densely packed von Economo Neurons (VENs). These neurons, named after the German scientist Constantin von Economo, were discovered in late 1920s. But only recently have they been thoroughly studied, and scientists believe that they help to give us a sense of 'I', empathy and to organize and monitor other parts of brain [2]. It is as if these neurons (which are just few hundred thousand in numbers) are like a symphony director and direct our thoughts and help in our concentration. Just like a symphony director who does not play any instrument himself but directs other players, VENs do not produce any thought themselves but direct other thoughts.

The VENs are different and much bigger (50-200%) than the other brain neurons [2]. They are characterized by having a single branch (dendrite) through which the signal flows. In the other neurons there are many branches emanating from each of them which attach to other neurons and hence the signals flow through all the branches to form neural pathways,

memory and thought. The single-branched, bigger VENs on the other hand allow much more rapid transfer of information and processing since they are faster conducting than the regular neurons and also the signal goes only through a single branch.

The ACC and FIC parts of brain are also very well-connected to sensory inputs and areas related to automatic control, decision-making or awareness. Thus, the rapid processing of information from these areas by VENs therefore allows them to act as policemen and “reality checkers”. Since VENs are few in number (two to four hundred thousand out of total of 100 billion neurons of brain) **they do not form a thought on their own** but simply compare the signals from the sensory organs with those emanating from the brain. This constant comparison of information from outside world and within gives us a sense of reality!

As ACC and FIC areas of the brain are densely populated by VENs, it is possible that these neurons maybe acting as a group. We can therefore call them von Economo Neuron Group (VENG). VENG is also initiator of ego.

Ego results when VENG synchronizes the information and signals from the rest of the brain. It is similar to music being produced when the symphony director directs individual musicians. In the same way ego results when signals from the brain-map of our experiences are directed by VENG; though one is not sure which part of the brain these signals emanate from. Thus, ego is like music!

VENs start forming just after birth and reach their maximum number of 2-4 hundred thousand by the age of eight [2]. This is also the age by which time a complete sense of self is ingrained as brain map. Thus, it is possible that this early brain map/VENG interaction gives rise to ego. With time the deep personal memories together with experience add to this ego. Also, as each person’s brain is unique, depending on their experience and genetic makeup, their ego is also unique.

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The line of reasoning of VENG helping in ego production is validated by observing the effect of hallucinatory drugs like LSD on brain [3]. When LSD-type drugs are taken, VENG signaling is reduced resulting in unchecked production of thoughts, hallucinations, and visions [4]. Some call this rich experience as creation of heightened reality and vision of God but almost all report absence of ego and self-awareness during drug-taking episodes! The brain with its 100 billion neurons when left to itself, and without the direction of ego or 'I' can create a myriad of thoughts, hallucinations, and visions. The VENG acting as a director gives the brain a certain order and keeps the hallucinations in check. It is as if in the absence of cat, mice have free reign! Ego (mediated by VENG) helps in controlling these hallucinations.

This experience of heightened reality is also obtained by advanced yogis in Samadhi [5]. In fact, the definition of Yoga, according to Patanjali, is suppression of thought waves [6]. Thought waves cannot be suppressed because a brain devoid of thought is a dead brain. I therefore think that Patanjali and other ancient Indian rishis intuitively knew about VENG and its suppression to bring calmness to the mind. Also, the Samadhi experience of suppressing VEN activity is more useful and powerful than drugs since it allows controlled activity of other parts of brain by will. Hence the rich experience of heightened or altered reality is enhanced and lasts for longer time than the psychedelic experience.

Similarly, during sleep VENG becomes dormant giving rise to rich dreaming process. Similarly, I feel that VENG activity is probably affected during the hypnosis so that the suggestions of the hypnotist directly control the brain of the person hypnotized.

Ego production by VENG may also explain the old brain riddle of why people with brain damage to certain section still retain their identity. I feel VENG simply directs the brain signals from the remaining brain-map to give a sense of a new ego.

VENG also plays an important role in concentration. With controlled activity of VENG it has a great ability to direct various signals from the brain and keep them in vision field for a long time. This is the basis of meditation.

In mathematics there is a term called limit cycle where non-linear systems (brain waves or thoughts are non-linear) can be made to oscillate forever in a stable fashion by having a proper controller. Thus the oscillations which are cyclic in nature become stabilized and hence are limited within bounds – thus the word limit cycle. VENG which is a controller or the director has the ability to do so. To my mind this is also the basis of Patanjali's Sanyam which is combination of concentration, meditation, and Samadhi [7].

An important aspect of limit cycle is the finely tuned controller [6]. If it is overactive, then the oscillations go out of control. For example, scientists have reported cases of suicides and extreme depression when VENGs are overactive. Antidepressant medicines help in reducing the activity of VENG. Similarly, if the controller is under active the oscillations die off. Scientists have also found greatly reduced VENG in several neuropsychiatric illness like dementia, schizophrenia etc. Thus, VENG has to fire in certain limits for stable functioning.

But how is VENG controlled? I think it is an autonomous self-controlling process where VENG and brain signals control each other to form a stable ego. When there is a mismatch then either the ego gets inflated leading to conflict and strife or gets deflated leading to depression and low self-esteem [8]. The ancient Indian yogic system of concentrating for a long time on a single thought and on the center of forehead might also be a mechanism of taming and controlling the VENG since its location is in that area.

The nature of VENG also throws light on anger emotion. I think anger emotions result when there is conflict between the reality validated by VENG and the brain map. Thus, when somebody shouts at us or says harsh things, there is a conflict between our sense of self and the reality (insult by

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others) which results in our getting angry. Similarly, when we do not get what we want (again a conflict between our ego and reality) we get angry and so forth.

The reduction of anger and calmness of mind comes when VENG is controlled by Yoga and conflict resolution takes place. This resolution happens when the brain map can be resolved through reasoning and is the genesis of the wisdom [9].

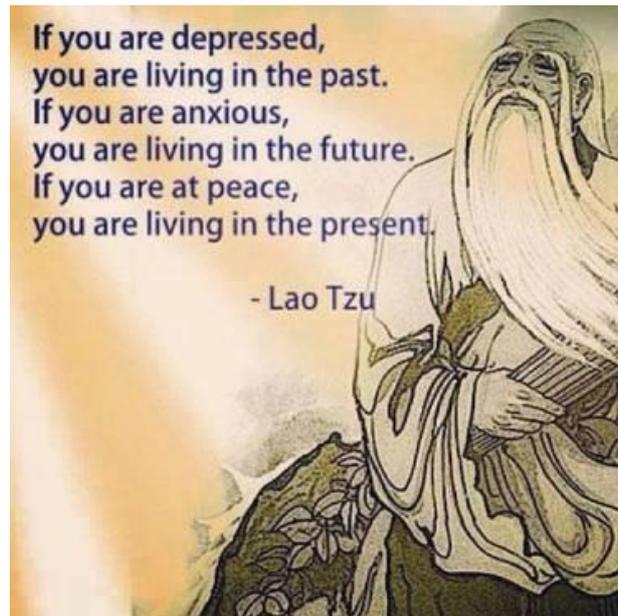
Reasoning can also take place when VENG makes it possible for the brain to modify its map according to the reality so that minimum conflict results. Thus, conflict resolution is one of the very important aspects of an evolved human being and comes from the calmness of the mind. This is also the genesis of humility since the control of VENG controls the ego.

Thus, there is no single place in the brain where ego or anger rests but is a dynamic process mediated by VENG. This is just like music which one can never say where it is, but when played by musicians exists!

This article was published in September 2012.



16. Be Centered in now



Most of the time we worry about events both past and future and have anxiety about them. This is the nature of mind since it thinks either about the future or about the memories of the past. I feel that happiness and peace of mind can come if we are anchored in “now”.

“Now” is very difficult to define because by the time we get down to it, it is already in the past! Even, Einstein, who was the high priest of time, always remarked that we do not understand “now”. He said we understand both future and past, but it is very difficult to grasp “now” [1]. Thus, for practical purposes “now” can be defined as work in hand and living on day-to-day basis!

Quite a number of people feel that we need to think about the future also, since most of us live on hope. There is nothing wrong with it and in fact, the mind-expanding process automatically starts thinking of future [2] and hope. However, this “hope thinking” should only occupy a small fraction of our time; with major portion devoted to “now”.

Being anchored in “now” is how nature evolves. It comes in equilibrium with all the forces at a given time and then the next evolutionary step takes

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place. This happens since nature takes time and effort to remain anchored in that period and evaluates all the probable pathways. In case it cannot come in equilibrium with the surroundings then it branches into the path that can do so and the branch, which could not come in equilibrium, withers away and dies.

There is a great lesson for us in this. If we are anchored in “now” then by coming in equilibrium with all the forces around us, we resolve the conflict and can live sustainable and happy lives. If we do not then our efforts and energies go in vain since too much thinking about the future leads to anxiety and frustration, as they are not in our control.

The old saying, “We will cross the bridges when we reach them”, is apt for this situation. It helps us to concentrate on the work in hand and hence allows us to be anchored in “now”.

In addition, the path to future becomes clear when we conquer “now” since by delving deeply in the work at hand it gives us the ability to grasp the opportunities that come our way. Also, this single-minded focus enlightens us and gives better sight!

It is also a sobering thought that the evolutionary forces are so powerful that, no matter how much we continue to think of the future and “will it”, we are all swept away by the “band” of evolution [3]. Our tiny efforts in the long run only help to propel this band.

The ability to anchor in “now” also prevents us from dwelling on any negative events of the past. Thus, the cycle of bad memories and their consequences is forgotten or resolved. This is the genesis of peace of mind and happiness.

Nevertheless, it is difficult to remain anchored in the present because the brain keeps on either dwelling on the past memories or keeps on making

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movies for the future. Brain is a dynamic entity and its internal churning, and the sensory inputs results in continuous thought production. This is how brain chatter takes place.

The only way to stop this chatter and be anchored in “now” is to focus on the work in hand or a single thought for a long time. This is the basis of Sanyam of Patanjali Yoga darshan [4]. When we get anchored in “now” through *Sanyam* then it allows our brains to function optimally and helps us to see the opportunities present at that time. Thus, the whole basis of *Yoga* is to be anchored in now!

This article was published in August 2016.



17. Where is the time and how to manage it?

This is the general refrain that one regularly hears from a modern-day harried person. Everybody is pressed for time. Has the time really shrunk? The physical time is going at its regular pace as it has since eternity, but it is our perception that time seems to have shrunk.

I think it is our insecurity which gives us the feeling that we are not achieving enough and hence the perception of shrinkage of time. We sometimes seem to be following the maxim “we are running all the time but going nowhere”.

The more choices we have the more insecure we feel since missing out is a constant threat and fear at the back of our mind [1]. One of the outcomes of this insecurity is the multitasking behavior that lots of people exhibit. For fear of losing out they would like to do many things at the same time with the result that nothing is done properly. This insecurity results in a feeling of emptiness since we always feel that we could have achieved more. Thus, anxiety and worry are signs of perception that there is not enough time.

A powerful brain which can evaluate all the choices can give us peace of mind. Such a brain is developed through Sanyam which is a combination of concentration, contemplation, and meditation on a single thought. However right from childhood the children are bombarded with innumerable choices which create attention deficit behavior and do not help them improve their concentration.

All great people manage their time well. They do their work by being totally immersed in the work at hand. They do not fret or worry about what could or should have been. With passage of time their body of work adds up to a considerable amount and shows up as a part of their achievements.

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Gandhiji was a great manager of his time [2]. To him every small thing had a value and hence he devoted all his attention and energies to the work in hand. Whether it was Charkha spinning or launching a major national movement; all things were equally important to him and endowed with a powerful brain he focused on them one at a time with tremendous concentration.

Similarly, Einstein, the high priest of time was never flustered not did he complain about time wastage. Once a famous European scientist came to meet Einstein by train which was late. The scientist apologized profusely to Einstein for having to wait for him at the station. Einstein calmly replied that there was no problem since he used the opportunity to think about a physics problem he was working on.

Einstein once jokingly explained the relativistic nature of time; “If you are with a beautiful girl in a park the hours appear to be minutes while if you are sitting on a hot plate then even a minute is like an hour”. Inadvertently he gave a very good explanation of the perception of time.

Thus, when we enjoy our work then the sense of time simply vanishes, and we are completely immersed in the work. All of us have experienced this feeling sometime in our lives [3]. That enjoyable feeling comes from the power of concentration and internal security. Somehow, we do not teach or inculcate this habit in our children.

The increasing power of concentration also gives us a perspective in life since it allows us to evaluate large number of choices. This helps us to differentiate between the important and trivial issues, allowing us to focus on the important ones which give us the luxury of doing things at a leisurely pace without hurry. Besides it also makes us reduce our greed and help us live sustainably [4].

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Thus, to create better- and well-balanced citizens we need to inculcate in our children the power of concentration and focus on work at hand. They will then have all the time in the world to do great and wonderful things.

This article was published in December 2014.



18. Do Boot Scan on Yourself

Boot scan on computers is done to clean the system of viruses and malwares. After the native boot scan the machine runs well. This native boot scan is supposed to be done regularly to have the computer running smoothly and without a hitch.

I think similar logic should be applied to human body and mind. We should do periodic boot scan on ourselves which should include introspection, giving time to oneself and cleaning of one's body. During our daily living we keep on accumulating lots of toxins both physically and mentally. Periodically we should get rid of them.

In the ancient times and even today quite a number of people do fast as a part of cleansing the body. However, majority of times it becomes a ritual. A true fasting process should involve reduced or no food intakes, spending time thinking about the basis of fasting and general introspection. Mahatma Gandhi's innumerable fasts embodied all these ingredients.

When native boot scan is taking place, the computer cannot process any data and for all practical purpose shuts down. Similarly, when we do our boot scan, we should focus only on cleaning our system both physically and mentally so that the body and mind become better and general feeling of wellbeing results.

Naturopathy regime allows a possible and good way to boot scan ourselves [1]. The regime includes colon cleaning by enema, mud application on stomach, fasting and general cleansing of body to get rid of toxins. The regime generally lasts anywhere from 5 to 15 days and if done with introspection then it brings great benefits to its practitioner. Once the body gets cleaned by such a system it also affects the thought process. I have a personal experience of this aspect.

Naturopathy was forced on me by my grandfather when I was twelve years old [2]. I used to have tremendous pain in my stomach after every meal. So, when I went to my village during a summer vacation, he forced me to undergo the 15 days' regime of naturopathy which included fasting, taking fruit juices only, enema, mud poultice on stomach etc. My grandfather never believed in any allopathic treatment and was greatly influenced by naturopathic treatment as practiced by Mahatma Gandhi.

My grandfather also gave me the book on Naturopathy to read and so the 15 days' regime was like a total immersion into it! The treatment stopped the stomach pain but one of the unintended and important side benefit was a great number of vivid spiritual dreams that I started having. It was as if the gut, heart and mind were working together after colon cleaning [3].

I have done this naturopathy only once in my life so I cannot be sure whether my spiritual dreams and experiences were because of colon cleaning or because of deep meditation that I had started practicing at that time [4]. At that young age the mind is very powerful and hence the body cleansing helped in getting wonderful dreams. Nevertheless, many people around the world have reported similar experiences after colon cleansing.

Nowadays there are many retreats for such “boot scans” all over India and in other countries. Most of them cater to rich people and includes fancy diets, designer enemas and fancy sounding rituals. All that is not necessary. One can have the retreat at home by having simple diet restriction, intake of fruits and boiled vegetables, introspection and getting away from internet and mobile phones. This can help us to boot scan ourselves and bring in calmness and rejuvenation of the body and soul.

This article was published in June 2013.



19. Try and remember all happy memories

Anytime you ask people about some of the happy moments in their lives, they have to really think about them. However, if you ask them about some unpleasant or sad moments, they will tell you hundreds of instances.

My mother who is 94 years of age has started hallucinating a lot [1]. Most of the episodes are of fear. Fear of losing her jewelry; somebody robbing her; how the small girl child is crying (could be her childhood memories); etc., etc.

When she is lucid, I have asked her why she is afraid when she is living a good life with everything taken care of and also asked her why she cannot think of some pleasant thoughts. She says there are hardly any! It is as if all the pleasant thoughts and memories have simply vanished or have gone so deep in her brain that she cannot access it.

What is the basis of such a thinking process? Science of neurobiology may throw some light on it.

There are ample indications that bad or unpleasant thoughts occupy major portion of our thinking though one is not sure of the exact numbers. There is socio-biological reasoning for it. In order to survive and continue living humans developed strategies to get resources and ward off enemies, predators, etc. This helped in developing the controlling instinct which allowed us to control our environment, hoard resources and other things including wealth. All these came with the baggage of insecurities and bad thoughts of harming others and in turn being harmed by them. These thoughts, insecurities and traumatic events produce very powerful memories in our brain.

As we age the percentage of anxiety driven thoughts increase since the lifetime of anxieties overshadow the happy ones. That could explain the fear

driven hallucinations of my mother. Besides with age the will power also reduces which in turn reduces the chances of accessing pleasant memories.

It has also been observed that once the negative or anxiety driven thoughts kick in more and more negative and angry thoughts start emerging from the brain. It is as if the brain goes in spiral about negative thoughts. This also starts in some people the episodes of depression.

When the ego goes in overdrive either because of adrenalin flowing or other inputs then large number of random neurons fire and neural pathways associated with existing memories light up [2]. And since the anxiety driven memories are stronger and much more than the pleasant ones, this could be the reason why we get one bad thought after another and leads to an agitated mind. The stronger the memory is the least resistance it offers for neural circuits.

The calmness of mind according to Patanjali comes when we focus on a single thought for a long time [3]. This process helps the brain to loosen other mental knots and allows the processing power of released neurons to focus on a single thought and help in reducing traumatic memories. This process gives tremendous happiness to the person. This is also the genesis of *Vivek* or wisdom which allows the brain to make decision after looking at all eventualities and helps in minimizing the painful thoughts.

Naturally this yogic process is achieved by tremendous discipline and years of practice.

A simpler mechanism to reduce the production of negative thoughts is to think of happy thoughts. Even Patanjali talks about it when he says, “To be free from thoughts that distract one from yoga, thoughts of an opposite kind must be cultivated”. This is a far better strategy than suppression of thoughts since suppressing them results in increasing the number of

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psychological knots. The suppression does not allow the thoughts to go away but only helps them to form powerful memories.

Happy thoughts unfortunately do not produce powerful memories but with continuous effort of cultivating them they can replace anxiety driven thoughts. That is the basis of all yoga which is to produce happiness.

This article was published in March 2019.



20. Persistence of Memory

One of the most famous paintings of surrealist painter Salvador Dali is called Persistence of Memory [1]. In this painting Dali has shown melting clocks with all of them showing the same time. This was probably Dali's interpretation of Einstein's theory of relativity where the space-time continuum is shown to be interlinked - space is flowing and time stands still. It is as if the memory of time got fixed in the painting.

Memories persist whether they are in human brain or in matter or in space (the movement of planets) and require energy and active intervention to change or remove them.

Memory can therefore be defined as an arrangement. Whether it is of numbers 0 or 1 (as in computing); atoms/molecules in a material or neural pathways in human brain or in the brains of other life forms. When the arrangement is changed by any means, or an external force memory is transformed. The building blocks of memory however, just like mass and energy are never destroyed. Only the arrangement changes.

We still do not know where the memory is stored in the human brain. Scientists have identified engrams (basically small neural circuits) which are signposts for the memory of certain object. However, the exact location of the memory of an object in the brain has remained a mystery and for an abstract thought, it is even a bigger mystery [2].

For mundane or shallow memory, the arrangement changes quite easily and regularly. This helps us in forgetting the day-to-day events and removes the clutter from our brain. However deep thought, which can produce very powerful memory, can reside in knowledge space (KS) and can be there for a long time leading to the persistence of memory!

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Deep thought is produced via *Sanyam* (combination of focus and meditation) on a single idea for a long time. This helps in producing a memory, which may reside outside the brain and in higher dimensional space called Knowledge Space (KS) [3,4]. Sage Patanjali calls such memories as *Sanskaras*.

Thus, KS may contain deep emotions and fundamental knowledge produced in the past and is continuously fed by the ever-increasing knowledge from various civilizations. A prepared and focused human mind can access knowledge from this space, and I feel that great discoveries of mankind have come from such access [5]. It is also possible that as earth moves around the sun and the solar system revolves around the center of the Milky Way galaxy, periodically we come across KS, which helps mankind to evolve. Similarly, a younger civilization than ours may come across KS developed by us and thus the evolution continues.

Human brain also has a memory of body map. This body map, which is an outcome of whole life's worth of memories and experiences, produces very deep impressions on the mind and could be the basis of the "memory of form".

At the time of death, it is the shedding of this body map or memory of form, which is painful. Thus, it is the continuation of memory of form which makes us fearful of death and gives us the instinct of survival. This instinct exists in all life forms and could be the basis of procreation and proliferation of species. Advanced yogis have used the technique of raising *kundalini*, which somehow allows to shed the memories of the body and thus make death a less painful experience [6].

Yogis claim that the memory of form persists for some time after death. This could be the basis of *Tervi* (thirteen day after death) ritual. However, this memory can persist for very long time after violent physical death and could

give rise to ghosts, ghouls, [7] etc. This happens since the body and brain do not get enough time to dissolve the memories.

I feel that it is this persistence of memory, which also gives rise to the theory of *Karma* since the strong memories in KS decide and guide one's life in subsequent births.

These memories in KS may also bring people and other life together, via reincarnations, through ages because of past connections [8]. The old adage “Janam janam ka saath” probably could be an outcome of such a process. With each birth the memories and connections either become stronger or weaken thereby changing the dynamics of bonds and relationships.

For making and breaking long held memories either in the brain or in KS a powerful mind is required. It is only possible through a huge human brain and thus getting a human body is a cause of celebration and the best thing to happen for a living being on this planet earth and in the present evolutionary timescale.

It is quite possible that in future we may evolve into entities, which may be able to change dimensions of space and be able to change the memories in KS much more easily than presently possible [9].

The whole basis of Yoga is to dissolve these memories either in the present brain or in the KS so that one can get out of the cycle of birth and death. Then the persistence of memory vanishes.

This article was published in October 2016.



21. Memory Formation and Removal – a Conjecture

We are defined by our memories. They are the only things we can call our own. All our experiences, ego, I, and our existence is sum and substance of our memories. They also guide us on our future journey in life and till the end of our existence those memories are with us.

Most of the memories we have can be divided into pleasant and unpleasant ones. These memories give rise to a whole range of emotions – love, hatred, jealousy, fear, happiness etc. To live a good and happy life we should strive to have mostly pleasant memories and see how the unpleasant ones are reduced or removed. However, the main focus of Indian *Yogic* system is complete removal of our memories at the time of final exit.

But what are memories; where in brain do they reside; how are they formed; and what is the possible mechanism of their removal? These are the issues that we will try to explore and explain in this article.

Previous research

Memory, its origin, and spatial location in the brain has been researched for hundreds of years. Extensive literature on it exists and hence this article is not a place to write the history of memory research, but we will briefly touch the salient features of previous research. One of the seminal work on memory was done by Eric Kandel who got the 2000 Nobel Prize for his work on this subject [1]. Kandel's main discovery was that the synapse plays an important role in memory formation and the consolidation of memory changes the synapse itself. Though this pioneering work on neurobiological basis of memory showed the process of memory formation and consolidation in few neurons but it did not show where the memory is located and how is it related to consciousness [2].

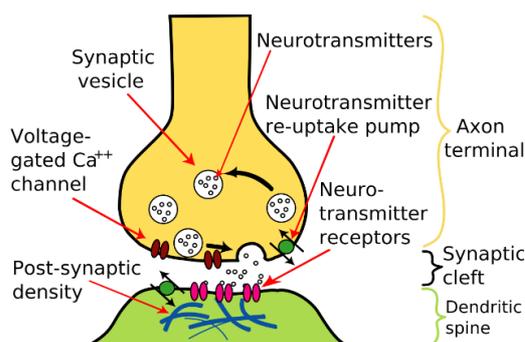
At the same time neurological basis of memory formation also does not explain the pliability and plasticity of neurons and neural networks. Scientists have recently found that with time the original neural networks shift spatially and yet are able to retain the same memory [3]. How this happens is still a mystery and thus we do not know where the memory exists and exactly what is it.

What is memory?

There are close to 80-100 billion neurons in the brain (the exact figure is not known) [4]. It is an accepted fact that a thought is produced when brain neurons fire. All the neurons are connected to each other by axons and dendrites. These connections are called neural pathways.

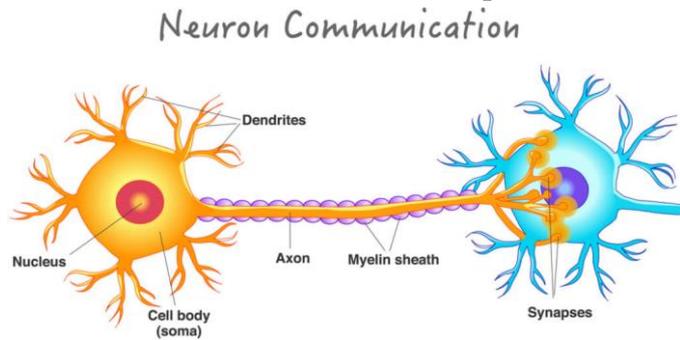
Memories are nothing else but the arrangement of neural pathways and the sequence of their firing. Firing of neurons is triggered either by signals from the sense organs or by stimulation of certain memory space in the brain. These firings produce a thought, and it is the visualization of thought that gives us a sense of memory. Since memory is an outcome of human thought, we will define what is a thought and how and where it is produced in the brain.

The firing of neurons is a process by which they communicate with each other. During this communication electrical signal from a neuron is converted into chemicals (neurotransmitters) and transmitted across the synaptic cleft to another neuron where it is again converted to electrical signal for onward journey.



Synaptic cleft is a tiny space of about 20 nanometres (nm) between two neurons and is the place where the neurons exchange information via neurotransmitters (NT) [5,6].

A neuron has three parts. At one end is the dendrite which accepts NT from other neurons; the central nucleus which is the heart of the neuron and a long nerve fibre called axon whose end (synapse) releases the NT for transmitting to the other neuron [7].



Why did nature produce this type of communication system where the electrical signal from the neuron is first converted into chemicals (neurotransmitters), transmitted through the synaptic cleft, and again converted back into an electrical signal?

A possible answer could be that during this conversion in synaptic cleft photons are produced which are the signature of thought [8]. I conjecture that these photons from a large number of neural pathways synchronize to form a **three-dimensional hologram which we can call a thought**. *Arrangement of neural pathways resulting in production of thought gives rise to memory. Memories therefore do not reside in the brain, but the arrangement of neural pathways does.*

Memory formation

Memory formation starts the moment brain starts forming in the womb. Very rudimentary memory of movement, swallowing, etc. starts in the second and third trimester of pregnancy. Prenatal memory starts forming around 30 weeks after conception. After this time, the foetus is affected by the food the mother consumes [9]. Fair amount of good data exists on how alcohol and drug use by mothers at this stage affect the children later in life.

The moment a child is born there is an explosion in memory formation. A child's brain is like a sponge for information intake. The neural pathways must be established. So, the sound, smell and other sensory organs start sending the signals to the brain for the formation of neural pathways.

However, the first solid memories are those when eyes start focusing. The input signals from the eyes are coordinated with those from the ears and help stimulate the neural pathways which results in the formation of a random hologram. This hologram is compared with the actual object and, when after many comparisons the exact match takes place, then the memory is etched in the brain.

The “comparer” of reality and hologram in this case is the nascent ego of the child which is still developing but is not strong enough to focus on a particular thing for a long time. This results in memories being formed and forgotten. Though the brain at this age is like a sponge for absorbing the information, the lack of focus does not allow the memories to become strong.

This is the reason why children have very few memories till the age of 2-3 years. With the developing of ego as we age, longer focus results and hence a stronger memory [10]. The memory is further strengthened when the child repeatedly performs the process of seeing, validating, and memorizing. This also helps in making neural pathways stronger when the child repeatedly produces the hologram of a given object.

Children are therefore particularly good at doing mundane things repeatedly because this is how they set up and consolidate their memories. Since the brain in childhood is virgin, those repeated early neural pathways are strong and thus some of the childhood memories are very powerful.

Many times, the parents get exasperated with a child repeatedly performing these mundane actions and scold the child. This should not be done because scolding starts a process by which new learning is retarded and fear complex takes over the brain.

As we grow older this process of memory formation and consolidation is repeated and a whole network of neural pathways is formed building upon

the existing ones, and this is the genesis of ego and of experience which is nothing else but sum and substance of memories [10].

If the hologram of a certain memory is not strengthened by repeated experiences, then those neural pathways are used for something else and hence the memory becomes weak and maybe lost as happens in children till the age of 2-3 years. Thus, memory is strengthened by repeatedly thinking about the subject in focus.

Therefore chanting, associating the images with signposts, etc. are ways of strengthening the memory. However, there are some people who possess photographic memory. They can immediately remember most of the details the moment they become aware of it. This happens because their brain possesses superior processing power. This is mostly inborn and may also have a genetic element to it.

Our memory formation is based on a sequence of events and hence the time is embedded in the memories. They are replayed as a movie and thus the sequence of events tells us about the passage of time. This is the genesis of time perception [11].

Since the neural pathways are formed sequentially, during recall one set of neural pathways triggers another set and thus the sequence of events is established. It is therefore quite possible that the *neural pathways of such events reside close to each other in the brain otherwise sequencing maybe difficult*. This triggering of sets of neural pathways is probably facilitated by ego. When ego becomes weak the triggering is reduced and the sequencing is lost. This happens temporarily during dreaming; and permanently in dementia, Alzheimer's disease, and other brain maladies [12].

Memory Removal

In everybody's life there are both painful and happy memories. It will be wonderful if we get somehow the ability to remove those painful memories.

Then we can all have better and happier life with pleasant memories. Most people think that if we do not think about those painful memories then they are gone. But painful memories produce strong psychological knots which remain buried in the brain. By some trigger they get reactivated, and the pain comes back again. To remove the pain a mechanism of actively removing such memories is necessary.

A possible mechanism of memory removal is to focus on a single thought for an exceptionally long time. It is called *Sanyam* in *Patanjali Yoga* [13]. This process requires many neural pathways. As the focus and concentration on a single thought becomes stronger even more neural pathways are needed for processing it thereby helping in removal of the other memories. Only with tremendous will power to think about a single thought for a long time can those neural pathways for other memories be weakened and reorganized for a new thought.

Memory removal is the most important aspect of Indian *Yogic* system which asserts that this leads to liberation. Also, with less memory attached to our soul during the final exit we can tunnel through the drag of gravity and other souls and reach the other worlds [14]. This is the easiest way to get out of the earth's gravity field.

This method of memory removal is also mentioned in ancient Indian philosophical texts. Thus, Patanjali says in his *yoga darshan*; "*When a brain becomes powerful and nimble it is like a pure crystal which takes the colour and shape of the object which comes in its view*". Such a brain is therefore able to focus like a laser on anything that occupies its vision field. This state is also called *Samadhi*.

Memory removal also helps in unravelling of memory knots, mostly made of emotional incidents, and helps in resolving emotional conflicts. There are many instances where the resolution of such conflicts helped people die peacefully. Another way to remove unpleasant memories is to cultivate the

habit of continuously thinking about the pleasant incidences that have happened in our lives. This could help in resolving unhappy memories [15].

This resolution also allows most of the brain's processing capability to be made available for the single thought. That is the whole basis of *Sanyam* of Patanjali where concentration, contemplation and *Samadhi* is carried out on a single subject so that complete knowledge of the subject results [13]. Such a brain can remove all its memories before the final exit and thus can make us free.

External memory storage

Many times, it happens that our PC's, laptops, and other computing devices become slow since they are cluttered with folders and other materials which take up memory space. After downloading most of the information on an external hard disk, the memory of the PC is restored, and it functions faster and smoothly.

In the same way uncluttering the brain of memories will allow it to function properly and faster. The uncluttering is needed since the psychological memory knots take up a good portion of the memory space. This uncluttering of brain through the memory removal process has been outlined in the previous section.

This process may however remove the resident memories (rewire the neural pathways) from our brain and is akin to deleting unwanted files in the computer. But there are other powerful and intense memories which are the result of emotional and painful episodes. These episodes take over the whole brain functioning, and it seems that during this time the focus of the brain is single pointed. This is similar to producing a very deep thought which can form a stable soliton and can exist for a long time [16]. I conjecture that such stable memories may reside in Knowledge Space (KS). Knowledge space could be equivalent to hard disk where our strong memories get stored automatically.

Knowledge space (KS) is defined as a space which may contain information structures or memories which are very stable and will remain there forever [17]. This space may also contain fundamental knowledge produced in the past and is continuously fed by the ever-increasing knowledge from various civilizations. A prepared and focused human mind can access knowledge from this space, and I feel that great discoveries of mankind have come from such access [18].

It is possible that KS, which is filled with memories of very deep thought and intense emotions may also have templates of various life forms. The memories of life forms remain in K.S. because these forms existed for an exceedingly long time (couple of million years). Thus, either a deep thought for a long time or “nearly constant” life forms for a long time produce these stable memories in KS. Even if the physical form disintegrates the ghost or memories remain in KS. This memory of forms or templates maybe the basis (besides the regular evolutionary forces) of new life forms for a young life-sustaining planet as it comes across KS in its journey through space.

We can also conjecture that the transfer of memories to KS from our brain is via a filter. Thus only deep emotional memories get transferred and mundane memories remain behind in the brain [19]. This process helps to reduce the loading of KS. The mundane memories however need to be removed via the memory removal process outlined in the previous section.

In the modern internet and world wide web if we want to completely remove our trace then not only we need to format our PCs, but also remove all the information from the net. This is not easy since the deep web contains the archived material with which we have been associated and it is exceedingly difficult to remove all of it. Somehow and somewhere the past can catch up!

Just like the hard disk can be formatted or cleaned when it is attached to the PC or a similar device, similarly we need to clean the memory from KS in this life or any other incarnation. The cleaning of memories in KS can only

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be done by intense thinking via the human brain. In case the reincarnation is in other life forms then this memory stays in KS without modification.

The traces of our memories in KS force our rebirth either here on this planet or other planets. This could probably be the genesis of *Karma* concept so often mentioned in Indian philosophy [20].

So, for true liberation from the cycle of birth and death, not only do we have to remove the memories from the physical brain but also clear them from KS [21]. This is what Patanjali says in his *Yoga Darshan*, “*As the mutations of gunas cease to function Kaivalya (Nirvana) results*”.

This article was published in February 2021



Better body for Healthy Mind

22. The three minds of the body

Since dawn of civilization, humans have always expressed love, feelings and emotional pain coming from the heart and basic feeling or intuition coming from the gut. Hence the expressions broken heart, gut feeling etc. Rationalists and scientists have scoffed at these expressions saying they are only metaphors, but recent research suggests that they may have scientific explanations.

It seems both heart and gut have a mind of their own and besides communicating with the brain about their activities they might also be helping in brain development, reducing depression, and just increasing the level of wellbeing of a person. We will try to show in this essay how brain, heart and gut minds work together to produce a happy person.

The Gut Mind

On an average a brain has nearly 100 billion neurons and is the seat of all our thinking [1]. The gut (digestive system of the body) has close to 500 million nerve cells and 100 million neurons and is almost the size of a cat's brain [2]. Not only does the gut "talk" with the brain chemically (by releasing chemicals which are then taken to the brain by blood) but also by sending electrical signals via the vagus nerve. Vagus nerve is one of the longest nerves inside the body whose central purpose is to relay the information and status of internal organs like gut and heart to the brain and vice versa [3,4]. It is a communication highway for all internal organs. It starts from the head and after going through all the organs ends near anus.

Most of the gut neurons are used in the daily grind of digestion [5]. Gut system is an extremely complex chemical processing machine which breaks down the food, absorbs nutrients and moves the waste down (via muscular contraction) towards anus for expelling it. Thus, the autonomous nervous system of gut allows it to work independently of the brain.

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Nevertheless, recent research has revealed that there is a tremendous amount of information flow from the gut to the brain via the vagus nerve and this flow is mostly one sided – almost all of it is from the gut to the brain and not the other way around [5]. This is how it should be since gut works continuously whether we are aware of it or not.

The reverse interaction (from the brain to the gut) is when we get hunger pangs and the brain tells the body to get food or when something goes wrong in the gut like pain or diarrhea, necessitating medicines for its cure. Sometimes these signals go haywire. For example, even if there are hunger pangs the brain overrules the gut and this leads to Anorexia!

Recent scientific evidence also suggests that a big part of our emotions is probably influenced by the chemicals and nerves in the gut. For example, 95% of body's Serotonin is found in the gut [5]. Serotonin is an important neurotransmitter which is a well-known contributor towards feelings of wellbeing. Sometimes it is also called a “happiness hormone”.

Similarly, researchers have found that a bacteria-free gut in early childhood leads to adults with less anxiety and general cheerfulness. Interestingly the effect of early childhood gut bacteria has the maximum impact on the developing brain and peters off by the age of 2-3 years just when the brain expansion also starts slowing down. Recently scientists have also discovered that the genesis of Parkinson's Disease is in gut [6]. Keeping gut clean and healthy produces a healthy brain.

Apparently, the ancients knew something about the gut-brain connection. Hence the colon cleaning process of Ayurveda (including enema etc.) or “gut wrenching” exercises of *Nauli* in Hath Yoga help in cleaning the gut thereby increasing the feeling of wellness. Similarly, the yogic exercise of *Mayur Asana*, where the body is balanced on the navel and this pressure on it stimulates the vagus nerve, helps improve the brain-gut connection.

There are also many instances of people experiencing extrasensory perception (ESP) or clairvoyance after colon cleansing has taken place. One of the reasons for this could be that a clean gut frees its neurons to help the brain increase its processing power. This extra neural power may help the brain process more information and help it in *Samadhi* or *Sanyam*. In nature every process has multiple uses. Though the gut neurons are used most of the time for gut activity, they also interact with the brain via the vagus nerve.

In Patanjali Yoga gut occupies the center of body-universe! It says that by *Sanyam* on navel (*Nabhi*, gut etc.), a yogi gains the knowledge of the constituents of the body!

The Heart Mind

Heart is one of the most important organs of the human body. Life starts when it starts beating (21 days after conception) and ends (clinical death) when it stops. Heart has nearly 2 billion muscle cells and 40,000 neurons. The heart neurons are very few in number compared to those in the brain (100 billion) or gut (0.1 billion). Nevertheless, these neurons transmit heart's signals and its condition to the brain.

The heart-mind interaction takes place both by electrical signals (via the vagus and the spinal cord nerves) and through chemicals (heart is an endocrine gland also). Recent studies have shown that heart sends signals to the brain that are not only understood by it but also obeyed. Scientists have discovered neural pathways and mechanisms whereby input from heart to brain inhibits or facilitates brain's electrical activity – just like what gut is capable of doing. Thus, both gut and heart mind help in overall thought process.

Besides the electrical signaling, heart is also an endocrine gland releasing peptides which help in blood pressure modulation and improving the functioning of kidneys [6]. These peptides also stimulate the pituitary gland

thereby helping it to release hormones like oxytocin commonly referred to as “love” or bonding hormone. Oxytocin also helps in increasing the wellbeing of a person. This could be the basis of saying that happy feelings emanate from the heart!

Nevertheless, the point of interest is the rhythm patterns of the heart which result when two billion muscle cells are triggered by AV [7] and SA [8] nodes which are like electrical switches. These nodes which are inside the heart send electrical signals to the heart muscles for contraction and are one of the most important organs of the heart. When they do not function properly the electrical signals to the muscles go haywire and the heart starts to flutter. A pacemaker attached to these nodes streamlines the signals and can restore the proper working of the heart.

The speed of heartbeat or its contraction changes depending upon our emotions. For example, when we are aroused either by passion or anger then the heart speeds up and in more quiet times or in meditation it slows down. This electrical input to the AV and SA nodes from the brain comes via the vagus nerve and is reflected in the ECG patterns of the heart.

Pranayama or breathing exercises can stimulate the vagus nerve and this could have a very beneficial effect both on the heart and gut. Similarly, the chanting of mantras or deep throat singing as practiced by Buddhist Lamas also stimulates the vagus nerve. It has been showing that this stimulation helps in reducing blood pressure and improves the rhythm patterns of the heart. The neural information from both these activities facilitates the cortical function and the effect is heightened mental clarity, improved decision making and increased creativity.

Similarly, the stimulation of the vagus nerve helps the gut to perform better and improves the cleaning process of the colon. For example, the ancient Indian custom of applying pressure on cheeks by fists while sitting on toilet seat helps in the bowel movement. The pressure on cheeks stimulates the

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vagus nerve since its branches pass through the face. This could also be the basis of children's cheek pinching by adults!

Recently scientists have also discovered that heart is involved in the processing and decoding of "intuitive information" [9]. Tests done on the subjects showed that the heart appeared to receive the intuitive information before the brain. This could be the basis of saying "Follow you heart and you will never go wrong".

This brain/heart interaction was also known to the ancients. In Patanjali yoga it is written that by *Sanyam* on the heart a yogi acquires the complete knowledge and contents of his mind.

Thus, in order to produce deep thought which helps in improving the wellbeing of a person [1], it is necessary that the gut and heart brains work together with the main brain. When all of them work together harmoniously then it creates a healthy body and a powerful mind.

Published as an article in Speaking Tree (Times of India), 29 May 2011.



23. Brain Gut connection

Five years ago, I wrote an article in Speaking Tree on how three minds of body – brain, heart, and gut work together to produce a healthy body and happiness. This was probably the first such article, which showed how the interaction between these three entities takes place. New scientific evidence supports this conjecture and shows how the brain-gut connection takes place.

Scientific evidence suggests that a big part of our emotions is probably influenced by the chemicals and nerves in the gut. For example, 95% of body's Serotonin is found in the gut [1]. Serotonin is an important neurotransmitter that is a well-known contributor towards feelings of wellbeing. Sometimes it is also called a “happiness hormone”. Similarly, researchers have found that a bacteria-free gut in early childhood leads to adults with less anxiety and general cheerfulness. Interestingly the effect of early childhood gut bacteria has the maximum impact on the developing brain and peters off by the age of 2-3 years just when the brain expansion also starts slowing down.

The brain-gut information channel is primarily the vagus nerve. Vagus nerve is one of the longest nerves inside the body whose central purpose is to communicate with internal organs like gut and heart and to relay their information and status to the brain [2]. It starts from the head and after going through all the organs ends near anus. The other brain-gut communication channel is via the blood flow.

Similarly, another recent study has shown that Parkinson's disease (PD) starts in the gut and not in the brain [3]. Alpha-Synuclein molecules, which are normally found in gut, heart, and brain, play an important part in neuron communication. The inflammation of the gut somehow triggers them to form a fibrous mesh-like structure there and this information is transferred to the brain both by vagus nerve and through the blood stream. This information then triggers the creation of Alpha-Synuclein fibrous mesh in the brain, causing the death of neurons and hence PD.

Apparently, the ancients knew something about the gut-brain connection. Hence, the colon cleaning process of Ayurveda (including enema etc.) or “gut wrenching” exercises of *Nauli* in Hath Yoga help in cleaning the gut thereby increasing the feeling of wellness [4]. Similarly, the yogic exercise of *Mayur Asana*, where the body is balanced on the navel and this pressure on it stimulates the vagus nerve, helps improve the brain-gut connection.

In Patanjali Yoga, gut occupies the center of body-universe! It says that by *Sanyam* on navel (*Nabhi*, gut etc.), a yogi gains the knowledge of the constituents of the body!

There are also many instances of people experiencing extrasensory perception (ESP) or clairvoyance after colon cleansing has taken place. One of the reasons for this could be that a clean gut frees its neurons to help the brain increase its processing power. This extra neural power may help the brain process more information and help it in *Samadhi* or *Sanyam*. In nature every process has multiple uses. Though the gut neurons are used most of the time for gut activity, they also interact with the brain via the vagus nerve.

Similarly, it has been shown that clean gut helps in getting deep sleep. Deep sleep is extremely important for well-being of humans. It detoxifies the brain by removing the toxins and extraneous memory from it. Mahatma Gandhi

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understood the power of clean colon and thus before sleeping he used to take enema.

This article was published in May 2011.



24. Cellular basis of yogic exercises

Yogic exercises are normally done to tone the body and the nervous system. Yogic exercises come under Hath Yoga system which is one of the eight limbs of “Ashtang Yoga” as enunciated in Patanjali Yoga sutras. Hath Yogis have believed that the body toning is a result of nerve stretching. This belief may have scientific basis.

Recently scientists have discovered that cells in human body change depending on how they are stretched [1]. They have shown that if you pull a stem cell in one way it starts developing into a brain cell; stretch it in other ways and a muscle or a bone cell results! And the most far-reaching consequence of this stretching is for cancer cells. Change their mechanical stress and they start behaving like normal cells!

The Yogic exercises of stretching the nerves and toning the nervous system that ultimately affect the cells mechanically can therefore affect the body in a very positive way at the cellular level.

Till now the biological and medical community believed that whenever they wanted to know why a cell behaved in a certain manner, they needed only to identify the genes, proteins and other chemical processes and pathways for the answers. Biological community considers chemical processes to be of paramount importance. However, in nature all the forces are considered for a system’s evolution and mechanical stress at cellular level is as important and prevalent as the chemical process.

Scientists have also discovered that though the cells in human body are subjected to mechanical stress and strain in every part of body, their native environment exerts the maximum effect on their growth and development [1]. For example, a cell stressed in a certain way will not convert into a nerve cell if it’s near a bone. The chances of it becoming a bone cell are higher

because of the physical and chemical environment of the existing bone structure.

This could be the basis of Yogic asanas which in their innumerable forms affect and tone very specifically the nervous system of different parts of body. Some like Pranayama, Nauli (gut wrenching), Sheersha Asana (head stand) and focusing the eyes to the center of forehead in meditation, affect the deep nervous system and could help in rejuvenating the body. Production of healthy cells is the most important aspect of rejuvenation of body.

For example, in the *dhyana asana* of focusing the eyes on the center of forehead, the optic nerve gets stretched by about 1-1.5 mm. This stretching may help stimulate the pituitary gland since the optic nerve passes very close to it before reaching the visual cortex at the back of the brain [2]. The pituitary gland is the master gland of the body, and its secretions help in maintaining the harmony of other endocrine glands. Besides it secretes the oxytocin hormone (also called happiness hormone) and almost all the sexual chemicals [3, 4].

Besides the Yogic exercises, general exercise regime of running, walking or aerobic exercises may also help in the cell rejuvenation. The “high” that people, who do regular exercises, get could not only be because of the secretion of chemicals by the brain but also because of the cell stretching.

Similarly, the deep muscle massage may also help in the stretching of cells. But it should be done properly otherwise cells may convert into other and harmful cells. For example, scientists have also found that prior to formation of invasive tumors, the cellular matrix surrounding the regular cells became stiffer [1]. This stiffening could be the result of physical or emotional stress. Thus, the change in “microenvironment” of cells with stress may be conducive to cancer formation. Scientists believe that one of

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the ways of curing cancer could be physical manipulation of this “microenvironment”. Yogic asanas may help in this process.

This could also be the reason why the Yoga practitioners have always suggested that some of the difficult Yogic asanas affecting the deep nervous system should be done under the supervision of experienced Yoga teachers, so that the cells are stretched in proper manner.

This article was published in June 2011.



25. Baldness + Solar energy = happiness?

Baldness gives unhappiness to a person. People feel it as a sign of getting old and the person feels that because of his baldness his looks suffer. People will do anything and go to any length to get a good crop of hair on their head. Worldwide hair loss treatment industry is worth \$ 3.5 billion/year.

However, new scientific evidence suggests that infrared (IR) radiation in solar energy is transmitted through bald head and may help in repair of neurons, their generation, and stop or reduce the ravaging effects of Parkinson's disease.

Bald human skull allows 10% of incident IR radiation to pass through it. IR radiation which has wavelength of 750-1500 nanometers is not visible to the naked eye and is the source of heat. On the other hand, visible radiation has wavelengths in the range of 450-750 nanometers.

Around 50% of solar radiation falling on earth is in the IR range. Nature uses this radiation very effectively since it helps in producing wind, evaporating sea water to form clouds and produce rain and to help the neurons function effectively in brain.

How the IR radiation helps in neuron repair and regeneration is still not fully understood. Some scientists say that IR, since it is mostly heat, helps in increasing the brains temperature and hence the activity of neurons while others say that the mitochondria, the engine which provides energy to cells gets repaired and energized by it leading to neuron repair and generation. Nevertheless, the beneficial effect of IR on brain is evident and has been shown in human and animal trials.

Infrared light therapy now days is also being used and promoted as a powerful and noninvasive treatment for patients suffering strokes, head injuries and as an eye treatment.

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In all ancient civilizations whether Greek, Egyptian, Indian etc. and in various religions, baldness or shaven head was identified with philosophers, monks, and priests. Some say that it was done to differentiate such people from common folks. Thus, a person with shaven head wearing an ochre robe is normally identified as a Buddhist monk or a *Sanyasi*.

But I feel that the ancients understood the power of solar energy on the bald head and hence the practice developed. Thus, it is possible that our ancient tradition of invoking *Gayatri Mantra* and practicing *Surya Namaskar* could be traced to the understanding of beneficial effects of solar energy radiation on human body.

The penetration of IR radiation into human brains is quite shallow and attenuates within 2-3 cm of entering the brain tissue but the blood flow in the brain allows the regenerated and repaired brain cells to be transported to different parts of brains.

Why are neurons affected by IR radiation? A possible explanation could be that during their firing they produce a feeble radiation in the IR range and by principle of equivalence they react positively to it.

So bald people, rejoice that nature and especially solar energy will help you in improving your brain and provide happiness since a supple and powerful brain is necessary for creating happiness. The main thing is to sit in the sun for 10-15 minutes every day. Not only will your brain become better, but you will also get much needed vitamin D.

Disclaimer: Author has a thick mop of hair and hence he has not experienced firsthand the beneficial effects outlined in this paper!

This article was published in March 2015.



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26. Road to Nirvana goes through stomach

Gautama Buddha, it is said, gained enlightenment when a village girl Sujata offered him *kheer* (rice pudding). After eating it he realized the noble middle path. *Kheer* gave energy to his brain and solace to his tortured soul.

Spirituality cannot take place on an empty stomach. At the same time enlightenment cannot be obtained on excessively full stomach. There has to be a middle path. This is what Buddha found out.

Great food not only gives energy for the body, but the taste and aroma provide balm for the soul. Body and soul are both nourished with great food.

The whole basis of life is food. Food provides energy for survival – the cornerstone of life and ultimately spirituality. It even provides energy to gods and could be the basis of offerings in the temples and shamanic rituals of animal sacrifice.

Enjoyment of food is like Yoga. If one really enjoys the taste and aroma of food while eating it then it helps focus the attention on the eating experience and is like a meditation. But for that the food has to be eaten slowly with proper chewing and should be relished. Both these things help in producing lots of saliva, which not only helps in digestion but also stimulates the vagus nerve.

If we follow the ancient Indian tradition of chewing every morsel 32 or 64 times, then not only will it help in proper digestion and help in reducing weight but the aroma of food can go directly to the brain and stimulate various centers depending on what food we are eating. The stomach filling and the provision of energy to the body comes later on. Probably that is the reason why mouth is closer to the brain than to the stomach!

That may also be a reason for the saying “You are what you eat”!

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Also, the food should be taken silently with the person being immersed in the experience. Talking, arguing, and thinking of worries while partaking food is unhealthy.

With fast modern life we gulp down the food most of the times like animals in order to simply fill the stomach. Enjoyment of rich aromatic food allows the other senses to kick in and provides the wholeness of experience. Thus, one of the exercises in mindfulness Yoga is to be immersed in the food experience.

Not only eating great food is enjoyable but cooking it is therapeutic since it allows the mind to focus on a single thought of cooking.

Vivekananda the great Indian Yogi used to be very fond of food and to him enjoyment in cooking and eating biryani was similar to what he experienced through deep meditation.

This article was published in December 2014.



27. In praise of long walk

Walking is like meditation. It helps us to focus the mind on a subject. Lot of people go for walks in the park both in the morning and evening either alone or with various friends, family and acquaintances. But I feel long walks alone and without any company are the best to think and contemplate on various issues.

Walking helps in jiggling your brain neurons and they fire better and faster during a long walk [1]. Walking is natural. One does not think about it. Yet during long walks the exercise of the body helps in release of chemicals which enhance thinking. Hence long walks allow the mind to think and churn the ideas and crystallize them. Human beings evolved to walk; running came only to get away from predators and danger. Thus walking is not only good for the body but also for the brain.

When the mind is thinking very deeply on a subject then the external scenery does not matter. During my younger days I used to go for 6-8 kms long walk in Lucknow and my path passed through congested thoroughfares like Hazratganj of Lucknow but was never distracted by the noise and the din of the traffic or the crowd [2]. One can easily be lost in one's thoughts during long walks.

Some of my best ideas and thinking have come while walking. Very often I have not taken notes which I have regretted because the power of ideas without jotting them down on paper vanishes like thin smoke.

Throughout the history of mankind major ideas have come to leaders while walking. Great scientists like Einstein, Niels Bohr and others took long walks in the forest and thought up great ideas in physics. Gandhiji honed his ideas of Salt Satyagraha and independence movement during the Dandi March [3]. Likewise Mao Zedong did it regarding his vision of China, during the Long March [4]. Similarly the great musical compositions of Beethoven and Tchaikovsky also came during their long walks.

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Walking anywhere is therapeutic but in the woods it is spiritual. It seems that trees act as antennas for getting higher spiritual thought and walking among trees helps to increase the power of meditation and hence the production of great thought [5]. Besides park and forest greenery provides balm to eyes and food to soul.

Besides the brain walking is also therapeutic for the body. According to studies world over walking is good for us because cardio-vascular exercise strengthens the heart and lungs, increasing overall fitness and is good for bones and helps boost blood circulation [6].

Doctors also claim that walking helps to drain the lower legs of excess fluid and can help prevent varicose veins through the pumping action of the calf muscles. And recent studies have shown that walking briskly can lower your risk of high blood pressure, high cholesterol and diabetes as much as running [7].

I feel that the habit of walking should be inculcated in children. Very often concerned parents force their children to play all sorts of sports. But walking is an excellent sport and if they walk either to school or to other places it will be good for their body and brain. Sports is good for body but does not allow reflective thinking since one has to be alert during play.

Nevertheless we should educate the children so that their use of cellphone either for listening to music or conversing during walking is minimum. Both these are distractions for thinking [8].

We seem to be losing the art of walking. The modern transport system has made us lazy. Very often I have seen young students either getting on two wheelers or waiting for a bus even for short distance travel when they can easily walk to their destinations. Besides increasing their chances of getting obese they are also losing out on the art of thinking deeply about issues.

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Finally I also feel that walking can help in reducing pollution in cities and towns besides keeping us fit. Thus by walking to the public transport station from our homes and places of work we can help in reducing the number of personal mobility vehicles on the roads.

This article was published in December 2013.



28. Why Good sleep is good for mind and body

Why do we sleep has still remained a mystery? We spend one third of our life sleeping. There must be a good reason why nature makes us sleep for this much time. Now slowly but surely scientific investigations are solving this puzzle.

One of the accepted theories so far has been that sleep helps in consolidating and also removing the memories [1]. We perceive the world during the day through our senses and it results in memory formation both shallow and deep. Sleep, it seems, helps in consolidating and removing some of these memories and unclutter the brain.

Another recent but fascinating theory (backed with experiments) has shown that sleep helps in flushing out from brain toxic protein waste and biological debris [2]. These are formed during the regular functioning of the brain during waking hours. It seems that during sleep the relaxation of brain helps in opening up the channels through which the debris flows into the blood streams and is removed from it.

Large number of studies all over the world has shown the beneficial effects of good sleep [3]. Sleep deprivation results in judgment impairment, mental illness like depression, heart problems, obesity and drastic reduction in general wellbeing of an individual. In an extreme case long term sleep deprivation has also resulted in death; though the cause of death was heart failure which could have been triggered by sleep deprivation. In fact, the first sign of sickness is fretful sleep.

Scientific studies have also shown that during sleep plaque (beta amyloid) which is responsible for neurodegenerative diseases like Alzheimer's disease and dementia is also flushed out [4]. Thus good sleep is extremely essential for a healthy brain and the body.

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The build-up of toxins in the brain due to inadequate sleep also affects the body. Though there is very little understanding of how this happens, but a probable cause is the passage of this information by the vagus nerve to different parts of the body [5].

As the brain starts getting affected by the debris build-up the message via vagus nerve to various organs might be to slow them down, resulting in lethargic action of these organs.

Since deep sleep and meditation both enable dissolution of memories, they may have similar characteristics and it is possible that during meditation the flushing of toxins from the brain may also take place [6]. A possible mechanism could be that since meditation results in the relaxation of brain, it may help in opening up the channels for flushing off the chemical debris.

Memory is formed both by producing new neural pathways and certain chemical changes in the brain. Memory removal therefore is affected by changes in both these mechanisms.

In deep meditation (where the focus is on a single thought for a long time, also called *Sanyam* by Sage Patanjali) new neural pathways are formed and the old ones get dissolved. This dissolution may have a chemical signature thereby producing toxic debris which needs to be flushed out.

How can we induce good sleep? Generally, when the body is healthy and the person follows a good exercise regime, then this helps to produce deep sleep. Production of deep sleep can also be helped by meditation. Studies world over have shown that long term practice of meditation helps in toning both the mind and body.

A good meditation practice to follow for quickly falling asleep is to close the eyes and focus attention onto the center of forehead. This can be done just before going to sleep and also when one wakes up at night and has difficulty

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in falling asleep again. Similarly, there may be other techniques to meditate so that sleep results.

This article was published in March 2016.



29. Is deep sleep like meditation?

Though a great deal of research in sleep and dreams has been done world over, yet why we sleep has still remained a mystery. The present scientifically accepted reason is that it helps to consolidate our memories and remove the unnecessary information. Thus, scientists say that during sleep when the inputs from our five senses are almost zero, the “mind/brain” takes stock of itself and helps in removing useless memories and consolidation of knowledge learned during the day.

I however feel that we sleep because it is like a forced meditation and just like meditation invigorates and charges our batteries so does a good night sleep. During sleep we go through four or five cycles of deep sleep and dreaming episodes. Each of these cycles is of 90 minutes duration.

Electroencephalography (EEG) studies done on human brain (during sleep) show that deep sleep is characterized by production of low frequency (1-4 Hz) Delta waves which are known to help produce life and mood-enhancing chemicals. This stage is also characterized by us being totally unaware of the surroundings. On the other hand, dreaming episodes characterized by rapid eye movement (REM) are of light sleep kind from which one can be woken up quite easily. Thus, when we wake up after a good deep sleep it is very refreshing and invigorating.

Similarly, it seems that in deep Samadhi one also produces Delta waves, though most of the studies of EEG and functional magnetic resonance imaging (fMRI) on meditating brain show prevalence of Alpha waves (8-13 Hz). This could be because the modern methods of EEG and fMRI are quite invasive and are unhelpful for deep meditation. The noise and intense magnetic field of fMRI and too many electrical wires of EEG dangling around the subjects' head do not create a conducive environment for deep meditation! Nevertheless, studies of EEG on some subjects have shown that in very deep meditation there is a spike in Delta wave production.

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Thus, the anecdotal data of great yogis in deep meditation provide the only proof that an outward sign of losing complete consciousness is similar to those in deep sleep. For example, the Indian saint Ramakrishna, when he achieved enlightenment, was completely oblivious to the world for almost 6 months. In order to keep him alive during this time he was force-fed by his guru.

As the deep sleep takes place, most of the peripheral brain neuron activity either reduces drastically or shuts down and only the central portion of the brain – seat of autonomous nervous system works. This region is also the place where long term memories are stored and where memory consolidation takes place.

An interesting aspect of peripheral brain shut-down could be the unraveling of day-long memories. Lots of irrelevant information takes up memory space and as the peripheral brain shuts down these memories get dissolved. This dissolution allows the brain to increase its processing power for yet another day.

Similarly, deep meditation also allows removal of *Sanskars* or memories as Sage Patanjali has stated, and this could be a probable mechanism to do so. In fact, Patanjali defines Yoga as suppression of thought waves and low frequency Delta waves in deep sleep could be a manifestation of this process.

In case the deep sleep is disrupted the memory, dissolution does not take place and hence the memory knots keep on growing resulting in irritable moods, short tempers etc. There is also a growing body of data in sleep research that in the large portion of people who are not getting enough restful sleep the incidence of diabetes, heart problems and even cancer are increasing.

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The production of Delta waves is only possible in a big human brain. All life forms sleep but the sleep of most animals is shallow since they have to be alert to the external dangers. Thus, their sleep is in REM mode.

Brain under anesthesia also produces low frequency waves but only in a fragmented brain. The communication between different parts of brain is stopped by anesthesia chemicals. However, in deep sleep the whole brain is active and is similar to that in deep meditation.

So how do we induce deep sleep? A possible way is by doing daily vigorous exercise and meditation. Both these activities help in dissolving temporary memory knots and producing conditions for better sleep. Deep sleep is also helped by reducing external inputs like sound, light etc. Thus, people who sleep in lighted environment do not get very deep sleep through extensive REM activity takes place. Similarly, when there are too many worries, and the mind is not at peace, the sleep is affected, and one cannot have a deep sleep.

This article was published in February 2013



30. Solution and Prophetic Dreams

Dreams as one of the attributes of brain are the least understood and yet most written about. Though science has progressed rapidly in trying to understand the workings of brain and sleep but why we dream and what do they signify has still remained a mystery.

Yet throughout the history of mankind there have been innumerable episodes of prophetic dreams and in every religion and society dreams have been thought to be the mechanism to connect the present physical world to that of supernatural. Thus, before Buddha's birth his mother Queen Maya dreamt that a white elephant has entered her body [1]. Similarly, Shri Ramakrishna's mother dreamt that a small green figure, whom she identified as God, was telling her that he will be born in her house or mother Mary dreaming about the birth of Christ. There are other innumerable instances of prophetic dreams in the annals of history of mankind.

Sage Patanjali also acknowledges the importance of dream when he says that a yogi can still his/her mind by contemplating on spiritual experiences obtained during the dreaming process.

Similarly, there are many celebrated cases where persons have produced wonderful solutions through their dreams. Kekule's benzene structure, Mendeleev's invention of periodic table, Howe's invention of sewing machine, Niels Bohr's atomic model and Mahatma Gandhi's idea of Dandi March came in their dreams [2,3,4]. There are also large number of examples where scientists, inventors and technologists have literally dreamt up solutions to problems which they could not find in the waking state.

There is a possibly apocryphal tale about the great inventor Thomas Edison producing solution dreams via an ingenious system. He used to hold heavy weights in his hands and would doze off in his chair. As he started to doze off the hands would relax, and the weights would fall on the floor with a big

thud waking him up. Many times, he said that during this stage of being half-asleep he got solutions to quite a few of his technical problems.

How does mind produce such prophetic and solution yielding dreams? The brain never sleeps. During sleep there is blockage of sensory inputs and thus the ego sense 'I' is suppressed [5]. Since ego is nearly absent the neural pathways in the brain are randomly energized resulting in disjointed and random thought patterns called dreams.

Depending on which pathways are energized the dreams are associated with those memories. Most of the times these memories are of everyday events and so the dreams are generally associated with them. Thus the probability of having such dreams is high and follows the Maxwellian distribution (the bell shaped curve) [6]. Also depending on the intensity of dreams we remember or forget them.

Sometimes however the suppressed memories and those of psychological knots are also energized resulting in nightmarish and frightful dreams. Similarly at other times when the memories of unfulfilled desires get energized they result in pleasant dreams. Thus, dreams are windows to soul and reflect the psychological makeup of a person.

However, under certain circumstances, about which very little is known, the brain is somehow able to synchronize the random thoughts into a powerful single thought. This could be triggered either by internal churning process in the brain or sometimes, in rare circumstances, by a signal from outside sources [7].

This results in Samadhi like state where nearly 100 billion neurons of the brain synchronize in a laser like fashion to produce a higher dimensional thought signature [8]. This thought connects us to the higher-dimensional knowledge space from which we get the knowledge and powers of clairvoyance [9].

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The probability of getting this type of synchronized dreams is very small but still is finite and lies at one end of the bell curve. The energy for such synchronization comes from very active thinking about the problems during the awake cycle and thus the probability of brain somehow activating those neural pathways during sleep is high. This sometimes results in solutions and prophetic dreams.

However, such prophetic and solution producing dreams come only to those who have a prepared mind and have been thinking deeply about these problems continuously and for long time [10]. As they say Gods always help those who help themselves!

This article was published in June 2020



31. Old age, reduced ego and Hallucinations

Mrs. Reena (name changed) is a 94-year-old woman who is wheelchair-bound and has started hallucinating a lot after she broke her pelvis in a fall last year. Thus, she constantly talks with her long dead relatives and her childhood acquaintances and imagines all sorts of weird things. She says she sees her dead relations with eyes open. The hallucinations were already happening intermittently, but after the fall the frequency of the episodes has increased rapidly. They also occur more often when she is sleep deprived. These episodes have also coincided with her diminished desire to live as if the ego is simply fading away!

During the dreaming process the ego is nearly absent and thus we have strange dreams [1]. The memories still exist, but during dreaming their sequence in time is gone. The dreams are basically an outcome of thoughts produced by neural pathways which are randomly excited since ego is absent to structure them. Thus, we may have dreams of people long dead interacting with us in weird ways and in very different places etc. They are almost like hallucinations.

Similarly, hallucinations also happen after consumption of mind-altering drugs like LSD, heroin, ecstasy, etc. The chemicals play havoc with the ego which is reduced drastically and with its reduction the whole world becomes dream-like with no sequence to the events [2]. An absence of sequence also gives the images and experiences a surreal quality. Thus, hallucinations are an outcome of the brain when the ego is absent or diminished drastically.

As the Indian population is aging, anecdotal evidence suggests that a very large number of people are suffering from dementia, Alzheimer's and Parkinson's disease and other brain-related illnesses. All of these lead to episodes of hallucination. In old people the ego starts reducing because the brain's processing power is reduced. Hence ego is unable to create proper neural pathways and sequencing, resulting in production of hallucination

episodes. This is also called mellowing with age! Ego or director of thoughts is nothing else but the sum and substance of our desires, memories, and experiences. It resides in frontal portion of the brain called fronto-insular cortex (FIC) [2].

Sequencing happens because there is a strong memory of events and objects. The directed neural pathways are like a thread connecting memories to produce sequencing. This experience is further reinforced when the sequencing is tallied with actual events. The brain actively compares its internal working with the actual events and produces a sense of reality.

When the neural pathways are triggered randomly the sequencing is gone and hallucinations result. How can we ensure that hallucinations do not occur? One of the ways to do it is to cultivate the habit of concentration or focus on a single thought for a long time, also called *Sanyam* in *Patanjali Yoga darshan*. This helps in increasing the power of the director or the ego. This process has to be cultivated from childhood and with strong memories the chances of hallucinations become less.

There are many episodes where prisoners, who were put in solitary confinement for long periods of time, maintained their sanity by repeating the memorized mathematical tables. This repeated rote learning helped in concentration and increasing the power of the ego or the director.

The present generation with a focus on smart phones and internet suffers from attention deficit disorder. They cannot focus on any idea for a long time and continuously get random thoughts with no control over them. As the mind gets used to having these unfocussed random thoughts there are good chances that in old age this may lead to hallucinations and other mental illnesses.

This article was published in December 2018.



32. How Homeopathy Might Work – a Conjecture

Homeopathy is an alternative system of medicine. It is used by about 1/7th of mankind. Yet how it works has remained a mystery. In this article I present a possible mechanism on how it might work. The idea was triggered by my study of the science of Pranayam [1].

I am an amateur homeopathic practitioner and have been using it for myself, my family and few of my friends for last 20-25 years. I have found it to be quite effective and specially so during COVID times. Many times, in the last 8-9 months, when I felt that I was coming down with flu-like symptoms I have used these medicines and in a couple of days the symptoms have vanished. There are hardly any medicines for flu in allopathic system, but homeopathy has.

Homeopathy system of medicine was discovered by German physician Hahnemann in 1796 and is based in the maxim “like cures like” [2]. It does not cure the disease but helps the body cure it by triggering in it fighting mechanism for that particular disease. The medicines are given after matching the symptoms.

For the last 220 years the homeopathic system has been fine-tuned and expanded and a large number of repertories have been published [3] Presently homeopathy is used by about 0.5 to 1 billion people worldwide though the exact figure is not known [4]. Thus 1/7th of mankind might be using homeopathy. Homeopathy industry market presently is ~ \$ 5.5 billion and in another 3-4 years it is estimated to reach \$ 16 billion [5]. Yet Allopathic doctors consider homeopathy as quackery and equivalent to Voodoo medicines since they cannot explain how it works. A question can be asked; if the homeopathy does not work then why so many people worldwide are using it?

A former International Director of Research at Roche had once told me that Roche has done extensive work in homeopathy and found that it works. When I asked him why Roche, the largest pharmaceutical company in the world, does not propagate its use he said that it will deal a crippling blow to their much more lucrative allopathic products, so the results have been suppressed.

Possible Mechanism

Homeopathic medicines work by going straight to brain via the olfactory bulb in the nose and by breaching the blood-brain-barrier (BBB) [6,7]. BBB normally does not allow foreign particles to enter the brain and is a mechanism to protect it. However homeopathic dilutions either with water or ethanol can do so easily.

Generally homeopathic medicines are given in the form of small globules which a patient is supposed to suck till they dissolve completely in the mouth. Through sucking of pills a small part of the medicine reaches the brain via the olfactory bulb. This helps the brain to trigger the mechanism by which body releases chemicals to fight the disease. That is why the best way to administer the homeopathic medicines is to spray the liquid directly on the tongue since this allows rapid transfer of the particle mist to the brain via the olfactory bulb. Also, homeopathic medicines are supposed to be taken half an hour before or after food consumption so that the food smells do not interfere with the aroma of medicine.

This mechanism of how medicines work through nasal route was serendipitously discovered when scientists were trying to find a cure for brain and other tumours via nasal sprays [8]. They discovered that small amount of medicines delivered through a nasal spray did a far better job than very powerful chemotherapy which wrecks the body with side effects.

The scientists also discovered that the efficacy of medicines increased with increasing dilutions. Digging deeper they also conjectured that the dilutions

made the brain trigger responses which were transmitted by the vagus nerve (VN) to the disease-affected area and helped in curing it [9]. I feel this is the mechanism by which homeopathy might also work.

Vagus nerve is the electrical highway of human body [9]. It transmits the signals from the brain to different parts of the body to keep it healthy. Triggered by homeopathic medicine the brain sends the signal through the VN so that the appropriate “medicine” is produced locally. This is similar to 3D printing where the design template is sent via internet and the physical model is fabricated locally by a 3D printer [10]. I feel that effectively body is cured, repaired, and kept in good condition by the brain. I think all medicines work on this principle. This follows the old saying; healthy mind leads to a healthy body.

Dilutions

Another interesting aspect of homeopathic medicines is that their potency increases with increasing dilution. There are conflicting reports on why this happens. I feel that increased dilution of medicine allows the BBB to be breached with relative ease resulting in its enhanced effect in the brain.

Nevertheless, one of the most contentious issues of homeopathy is the fact that at higher dilutions, thermodynamic calculations show that there is not a single molecule of the original medicine in the mixture!

This has led to bizarre theories of how homeopathy works and includes “memory of water” as proposed by French scientist Jacques Benveniste in early 1990s [11]. He proposed that the memory of water based on the original medicine helped in producing homeopathic cure!

However, a simpler answer may lie in understanding that in extreme dilutions (as found in homeopathic formulations) the solutes form aggregates which are nearly impossible to be removed from the solutions [12]. I feel it is these aggregates which reach the brain and trigger the

medicinal properties for cure. Also, extreme dilutions change the physical-chemical properties of solvent which may further assist in the healing process [13].

Thermodynamics is the science of averages. All thermodynamic properties follow the bell curve. Thus, when we say that the temperature of air is 30 degrees Celsius then it is the outcome of large number of air molecules with average energy impinging on our thermometer which gives rise to this temperature. However there also exist few air molecules which have higher energy and thus are very hot and similarly there are few molecules which have very low energy and are extremely cold. These molecules (outliers) lie on both sides of the bell curve and do not affect the temperature reading since they are few in numbers.

Similarly, when we have dilutions and calculate the number of molecules of the original medicine that may be in the solution, we do the calculations based on averages. It is the outliers which give homeopathy its medicinal properties and when they reach the brain it helps the brain to trigger the release of information which travels through the vagus nerve.

Scientists also conjecture that vagus nerve is extremely important in improving the immunity of body. Thus, Vagus nerve stimulation (VNS) (both electronically and chemically) is a new buzz word in improving the health of a person [14]. Scientists believe that VNS helps in alleviating pain, in reducing several ailments like asthma, anxiety-related disorders, heart failures, among others. I conjecture that homeopathic medicines might be chemically helping in this VNS process.

This article was published in December 2020.



33. My Spiritual Experiences

I do hope you have enjoyed reading some sections of the book and it has given you ample food for thought. I would now like to share with you some of my personal spiritual experiences, which have shaped my life and led to my writings on spirituality.

I was born and raised in Lucknow, the capital of Uttar Pradesh [1]. My father, Jagdish Prasad Rajvanshi, who was a freedom fighter was imprisoned in 1942 freedom movement in Delhi and then sent to Lucknow jail. In 1946 on his release from the jail he liked Lucknow so much that he decided to make it his home.

Our first house was in Hazratganj (center of Lucknow) and in 1960 we moved into a flat in Lalbagh near Hazratganj. I went to a well-known missionary school called St. Francis High School. One of the things I hated about the school was its strict discipline (the headmaster was a terror) and wearing of tie. I still remember that the moment I was out of the gate of the school the tie was taken out and stuffed in the pockets of the shorts. Thus ruined, the tie had to be replaced periodically and this resulted in constant scolding from my mother. Somehow wearing the tie and speaking English symbolized to my young mind colonial control and this attitude might have come from the influence of my father. I therefore inculcated the habit of reading books in Hindi and became an avid reader of Indian folk tales.

On my thirteenth birthday in 1963 I was given a present of a Hindi translation of Mahatma Gandhi's autobiography. Reading this book completely changed my life. I became obsessed with it and read it continuously - in the process neglecting my studies and other activities. Gandhi's early years simply caught hold of my imagination and there arose a great desire to know about the religions of the world.

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How this leap took place I don't remember but it must have been triggered by reading Bhagwat Gita since this was Gandhiji's favorite book. I therefore embarked on the journey of reading all the religious books that I could get from the local library - Gita, Koran, Bible, Rigveda, Upanishads, Patanjali Yoga, Vivek Chudamani, etc.

As can be imagined, how much can you absorb at the age of 13 or 14, but the desire to read all these books was intense. Nevertheless, reading of Patanjali *Yoga Darshan* created a tremendous impression on my teenage mind since it showed that one could gain superhuman powers by practicing Yoga [2]!

Together with the reading came the desire to practice some of the things that Gandhiji did. Thus, I became totally vegetarian, started eating mostly boiled food and also started meditating. Meditation was done as described in Shri Ramakrishna's biography. The meditation, which sometimes lasted for one to two hours, produced wonderful feelings and dreams.

I remember starting an experiment of meditating on my heart and visualizing that it contained a small earthen lamp. This resulted in a tremendous feeling of love and good feelings for everybody. If I remember correctly this must have lasted for a month or so but I got frightened by the experience and hence stopped the heart meditation. I tried repeating the same meditation many years later but was never able to duplicate the experience of love.

I also remember that during this time (especially during school holidays) I went for long walks of eight to nine kms [3]. Most of my thinking has been done during long solitary walks and this habit has continued till today. Lucknow in early and middle 1960s was a beautiful city with lots of parks and my walks ended at cremation grounds near Dilkusha Gardens beyond the famous La Martiniere School. Beautiful trees surrounded these grounds and since nobody would come there, it was very peaceful. I would often

meditate sitting on the platform where the bodies were burnt. When my mother came to know about it much later on, she scolded me to no end. I never felt any fear but just a sense of peacefulness.

After schooling in Lucknow, I entered Indian Institute of Technology (IIT), Kanpur in 1967 as an undergraduate student to study mechanical engineering [4]. IITs are the most prestigious engineering colleges in India and perhaps in the world. One gets into them after an extremely competitive entrance exam. Thus, in early years of my IIT days I got quite involved in studying engineering and spirituality took a back seat. Somehow in the fourth year of my studies I got an intense desire to study the world literature. This could have been triggered by the humanities courses I took under an excellent professor. In those times IIT Kanpur had a first-class library with a large literature section. Thus, I read most of the books by great authors like Jane Austen, Knut Hamsun, Dostoyevsky, Tolstoy, Thomas Hardy, Thomas Mann, etc.

I believe at the age of 19-20 years the brain is at its prime and so can absorb huge amounts of input information. Despite my intense literary readings, I could still do reasonably well in my engineering and got good grades. However, I felt that the best part of my IIT education was the study of humanities subjects and my ability to write this book is a direct outcome of that education. There is a general tendency among students of professional courses to give a step-motherly treatment to humanities, but I believe study of such subjects gives one a well-rounded education. Hence, I feel that humanities subjects should form a compulsory part of curriculum in all professional colleges. The meditation and intense reading produced wonderful and remarkable dreams. Some of the vivid ones I can remember were:

- I am running in the courtyard of our house in our village and a bright beam of light descends from the sky and hits my right side. My face and

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shoulder are totally engulfed by it. There was no fear - just a feeling of wellbeing.

- In another dream I saw a fire-breathing dragon which would have killed me. I immediately recited the name of Lord Shiva. He appeared and gave me a bow and arrow with which I killed the dragon. I am sure both these dreams may have been influenced by some of the movies on holy people that I saw as a child.
- One dream was really strange. I saw my younger brother and myself all alone in a desert. The skies suddenly opened up and a beam of bright white light bathed us both. But besides the light I also heard wonderful western classical music. Since at the age of 13 or 14, I had no access to western classical music, this dream was something very strange.
- One dream was of an out of body experience where I am in the battlefield and "killed". However, the "I" remained, and it could go anywhere and pass-through walls and obstacles.
- Another dream showed that I am travelling in a spaceship and witness the formation of galaxies in an egg-shaped envelope. This was really fantastic and psychedelic and could have come out of almost any science fiction movie.
- In one dream I saw myself levitating by climbing on invisible steps. This dream came at the time when I was thinking deeply about gravity. A thought therefore came that probably gravity is quantized.

These types of dreams continued even later and there was a time (sometime in early 1970's) when I continuously had dreams of having discussions about the future of India with leaders like Mao, Trotsky, Lenin and above all with Gandhiji. There were many dreams of Gandhi. In one strange dream he even merged into my body!

The whole idea behind writing this is to tell the readers that these events did remain at the back of my mind. And did help in preparing it for the work outlined in the present book. In fact, it goes to show that once the mind gets

prepared then it can tune into the relevant dimensional space and can start receiving knowledge.

Such knowledge did come out of the blue one day. I was doing my research for Ph.D. at University of Florida, Gainesville, USA in the area of thermal applications of solar energy [5]. After lunch I was walking back from my home to the office through a thick pine grove when suddenly a thought came that gravity and human thought are somehow related. The idea (which occurred in later part of 1977) was so powerful that it caught hold of my mind for next 4-5 months and I could hardly concentrate on anything else. Since this idea came suddenly and so powerfully, I was convinced that it was true - otherwise it would not have come.

Obviously, I can be charged with delusional thinking (I have not been able to provide a foolproof relationship between thought and gravity though recently have tried to explain it in chapter 59), but the idea seemed intuitively true that day and even today after more than 40 years later. I am sure my readings on gravity and attendance of lectures on cosmology at the University must have helped, but the idea came in a flash. This single idea propelled me to start writing on mind/matter interaction. Somehow, I also felt that the pine groves acted as antennas for this thought [6]!

In 1981, I came back to India from US to work on rural development in Maharashtra and somehow the work on thought, gravity and spirituality was again put on the back burner [7]. Hence, I did not do any serious study or write on them till 1991. In March 1991 I had gone to give guest lectures at Indian Institute of Technology (IIT), Bombay when I slipped in the IIT Guest house and nearly fractured my spine. The pain was the most severe I had in my life. Fifteen days later I started writing on spirituality and have never looked back. Strange are the ways of the Lord!

This article was published in May 2004.



Section II: Environment

Introduction

All life forms want a comfortable and happy life. In case of human beings, it is a sum of two things, personal happiness, and better environment.

Personal happiness can be obtained from a variety of ways. Basically, one becomes happy when one is contented or at peace with oneself. We have discussed this in Section I.

Environmental happiness is what I call community or nation building. It is the enabling environment which makes you feel happy to live in, work in and just be a part of it. This environmental happiness also gives us a sense of belonging, makes us feel proud of our surroundings and gives us a sense of ownership. If we create a happy environment for our work and living, then we will make this country a great place to live. Each one of us should therefore work towards improving our immediate environment so that it becomes nice and cheerful. Then we will be proud to be a part of it.

Long ago (mid 1990s) I visited a hut (tin shed) of a farm labourer called Sidhram in the village of Vinchurni near Phaltan. The evidence of poverty I saw in his hut shattered me and propelled me to look at solutions to make the lives of the rural poor better. He had a broken kerosene hurricane lantern for light; the broken glass chimney had become black with soot. He cooked food in a few beat-up aluminium utensils and mostly survived on *bhakari* (sorghum and bajra bread), *chutney* (made up of green peppers and some spices). He cooked his meal on a three-stone wood stove and ground the chutney on a flat stone grinder. He had a few clothes which he washed every day, and a thin mattress with a worn-out sheet that also doubled up as a pillow. These were his total possessions.

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Anytime I think of a rural household, the image of Sidhram's hut and its belongings comes in front of my eyes. His case may be one of extreme poverty but a majority of the rural population in India lives in similar conditions.

In fact, it should be a matter a shame for all of us that even 72 years after independence, 60% of our rural population (100 million households) live in poverty. They lack the basic amenities of life that we take for granted. For example, they live in one-room huts with nearly non-existent electricity; cook on primitive biomass cookstoves which produce tremendous indoor pollution; lack potable water and toilet facilities. Somehow modern technology has not touched their lives. According to the latest World Bank report, 33% of the world's poorest live in India and also has the maximum number of malnourished population in the world.

However, our development model has to be very different than the present unplanned, haphazard, and based on corrupt practices. It should be based on high tech, decentralized energy sources and increasing green spaces.

India is a land which produced the greatest philosophical thought thousands of years ago. That thought could not be created in a society which was based on chaos that we see today. India of ancient times must have been a beautiful country with great environment, abundant food, and water and only such an environment was conducive to produce the great philosophical thought.

It is my dream that all of us should work to produce a great and enabling environment so that India can again show world a new way. This section has articles that I wrote on this theme.

34. Planting healthy air in cities

The first thing that one sees when a flight approaches New Delhi is thick smog that envelopes the city and the lack of greenery. In almost all other major cities in India lack of greenery is the most obvious sight that one sees when approaching that city by air.



The sorry state of Delhi's air has recently been in the news [1]. I feel that planting trees on a large scale in cities is one of the best solutions to air pollution.

Large body of data on the beneficial effects of trees has been published world-over. It has been shown that trees are excellent in capturing harmful particulate matter (PM) of 2.5-10 micron (micrometer) size [2]. These particulates are mostly produced from automobile exhausts and from burning biomass. When inhaled, the 2.5 PM particles can also go directly to the brain [3] and can cause various ailments including cancer while PM 2.5 to 10 particles cause asthma and various other lung diseases. There are guestimates (since the numbers are speculative) that 3 million deaths per year world-over are due to inhalation of this particulate matter [4].

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Trees capture these particles quite effectively in the following way. The waxy surface of leaves and their random orientation help in capturing them. Also the leaves are positively charged [5] and hence attract the negatively charged 2.5-10 PM particles [6]. All these three mechanisms make a tree an excellent particulate remover. This was corroborated by a 2016 study at University of Exeter in UK [7] where researchers found that more trees in urban neighborhoods correlated with a lower incidence of asthma.



Researchers have also discovered that if about 20-30% of city area is covered by trees then it can reduce the particulate pollution by almost 24% [8]! In most Indian cities tree cover is between 7-15% and hence there is a need to increase it. Besides reducing air pollution trees also make-up the planet's heat shield. They keep the concrete and asphalt of cities and suburbs 4-5°C or more degrees cooler and protect our skin from the sun's harsh UV rays. Tree cover also reduces tremendously the air conditioning load of buildings.

Though the leaves of every type of tree catches the pollutants, one of the best catchers are conifer trees (pines or those with needle-like leaves) [2]. They are also evergreens (do not shed their leaves during winter) and have shown to have the highest efficiency in catching particulates and dust. Thus, there should be a healthy mix of evergreens in the tree selection for planting.

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The efficiency of particulate capture reduces when the leaves are covered with dust and oil from the vehicular pollution. However, a single rain shower cleans them up and they become ready for the process of removing particulate pollutants. Besides trees can also be cleaned by ground - based high speed hoses. This is far better and cheaper than the artificial rain that some people have suggested for removing air pollution.

Trees have nurtured life since time immemorial. They are literally a bridge between heaven and earth. They take water and minerals from the soil through the roots, carbon dioxide from the atmosphere through their leaves and with the help of solar energy convert them into oxygen and food - the two fundamental ingredients of life. Without trees there would be no life on this planet earth.

Trees are also rain producers since the evaporation of water from their leaves changes the microenvironment and helps in rain precipitation. Increased rain can also reduce air pollution.

Trees also help clean the air and environment by reducing dust, reducing noise pollution, absorbing pollutants like carbon monoxide, Sulphur dioxide, nitrogen dioxide, etc. and fighting soil erosion.

Couple of years ago the state highway in front of our house was widened. The noise of heavy machinery and the dust clouds produced by earthmovers were effectively dampened by layers of trees in our garden. Without trees, living in our house for those 3-4 months would have been hell.

Trees also release vast clouds of beneficial chemicals. On a large scale, some of these aerosols appear to help regulate the climate; others are anti-bacterial, anti-fungal and anti-viral.

Trees are nature's water filters, capable of cleaning up the most toxic wastes, including explosives, solvents and organic wastes, largely through a

dense community of microbes around the tree's roots that clean water in exchange for nutrients, a process known as phytoremediation [9].

If all the above services were to be provided by man-made machines, then it would cost mankind about 4 trillion dollars per year (twice the size of Indian economy). A recent study concluded that for city of Mumbai alone trees provide about 13 billion dollars' worth of ecosystem services [10]. Thus trees and forests provide services which are nearly impossible to be provided by any other means.

In the old times there used to be a slogan for tree planting - Each one plant one. I think it should be revived and it is in the interest of every city dweller to plant trees. A simple method is to carry seeds of any tree variety in one's pocket and keep on throwing them around especially in the rainy season while walking near the roads and empty spaces in cities. With time some of them will germinate and grow. If each one of us does it, then cities can become greener. However, this to happen it is necessary that the local governments (forest departments) should make the seeds of trees available to general public.

Also, too often the tree litter is burnt in most cities and towns which further increase the city's air pollution. All leaf and other tree litter should be composted to further enrich the soil for more trees to grow.

Besides cleaning the atmosphere physically, trees also act as spiritual antennas. Gautam Buddha, Ramakrishna and other saints achieved enlightenment under a tree. It is said that even Newton got his idea of universal gravitation when an apple fell from the tree under which he was sitting. History is full of examples on how some of the great thinkers got their ideas while taking long walks in the woods [11].



In Japan, researchers have long studied what they call “forest bathing” [12]. A walk in the woods reduces the level of stress chemicals in the body and increases natural killer cells in the immune system, which fight tumors and viruses. Studies in inner cities show that anxiety, depression and even crime are lower in a landscaped environment.

Having lived in a house surrounded by lots of trees for the last 40 years, I can vouch for their beneficial effects. Trees provide balm to eyes, green lungs to my surroundings and solace to the soul.

This article was published in November 2017.



35. Trees as spiritual antennas

What will be world without trees? It will be a desolate, desert-like environment. Trees provide balm to eyes, green lung to the planet and solace to the soul. Besides they can also act as antennas for spiritual thought and Universal consciousness.

Gautam Buddha, Ramakrishna and other saints achieved enlightenment under a tree. It is said that even Newton got his idea of universal gravitation when an apple fell from the tree under which he was sitting.

Trees have nurtured life since time immemorial. They are literally a bridge between heaven and earth. They take water and minerals from the roots, carbon dioxide from the atmosphere through their leaves and with the help of solar energy convert them into oxygen and food - the two fundamental ingredients of life. Without trees there would be no life on this planet earth. Besides being food producers, trees also provide other services to mankind.

Trees provide housing and shelter to most living animals and also provide shade from scorching sun and rain. Trees are rain producers since the evaporation of water from their leaves changes the microenvironment and helps in rain precipitation.

Trees also help clean the air and environment by reducing dust, reducing noise pollution, absorbing pollutants like carbon monoxide, Sulphur dioxide, nitrogen dioxide etc. and fighting soil erosion.

Trees are nature's water filters, capable of cleaning up the most toxic wastes, including explosives, solvents, and organic wastes, largely through a dense community of microbes around the tree's roots that clean water in exchange for nutrients, a process known as phytoremediation. A 2008 study by researchers at Columbia University found that more trees in urban neighborhoods correlate with a lower incidence of asthma [1].

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Trees also release vast clouds of beneficial chemicals. On a large scale, some of these aerosols appear to help regulate the climate; others are anti-bacterial, anti-fungal and anti-viral. They also act as the planet's heat shield. They keep the concrete and asphalt of cities and suburbs 10 or more degrees cooler and protect our skin from the sun's harsh UV rays. Tree cover also reduces tremendously the air conditioning load of buildings.

If all the above services were to be provided by man-made machines, then it would cost mankind about 4 trillion dollars per year (more than three times the total Indian economy!). Thus, trees and forests provide services which are nearly impossible to be provided by any other means [2].

Sleeping under a tree is an extremely pleasant experience and I still remember my childhood when we used to sleep outdoors at night with a huge peepul-tree nearby. One of my earliest memories is of moonlight reflected on its shimmering leaves giving the impression that thousands of small angels are descending from heaven!

In Japan, researchers have long studied what they call "forest bathing". A walk in the woods, they say, reduces the level of stress chemicals in the body and increases natural killer cells in the immune system, which fight tumors and viruses. Studies in inner cities show that anxiety, depression and even crime are lower in a landscaped environment [1].

Trees have also been used as radio antennas by US and other armies. In fact, they have found them to outperform other forms of electrical antennas [3]. Human thought which is also a form of electromagnetic wave (though we still do not know what its waveform is) could also be transmitted and received using trees as antennas.

Natural systems use all the forces surrounding them. Through million years of evolution nature has developed a mechanism of transmitting low level signals through long distances using the surrounding media as transmitting

agent. Thus, low level whale songs can be transmitted through thousands of kilometers in ocean. Similarly, it is possible that low level signal that we call human thought could be transmitted to long distances with the help of trees as antennas.

My personal experience has been that walking under a canopy of trees not only gives a sense of wellbeing and happiness but also acts as spiritual antenna.

In 1977 I was doing my Ph.D. in Mechanical Engineering at University of Florida, Gainesville, U.S. One day after lunch I was walking back to the office from my apartment through a thick pine grove when suddenly a thought came out of blue that human thought and gravity are related [4]. This single thought started my journey on spirituality. The idea was so powerful that it caught hold of my mind for next 4-5 months and I could hardly concentrate on anything else.

Since this idea came suddenly and so powerfully, I was convinced that it was true – otherwise it would not have come. Obviously, I can be charged with delusional thinking (I have not been able to provide a foolproof relationship between thought and gravity), but the idea seemed intuitively true that day and even today after more than 25 years later. I am sure my readings on gravity and attendance of lectures on cosmology at the University must have helped, but the idea came in a flash. This single idea propelled me to start writing on matters of mind/matter interaction and spirituality. Somehow, I felt that the pine groves acted as antennas for this thought [4].

Thus, it is in the interest of mankind to populate this planet with trees and forests. Besides nurturing us the trees will also provide a means of communication with beyond.

This article was published in May 2012.



36. Possible water solutions

Humans cannot survive without water. We can survive without food for a couple of weeks, but water is the most essential ingredient of life-- just like oxygen and we cannot survive for more than a few days without it.

All our activities have water embedded in them. Whether agriculture, industry or anything else, water is an important part of all products and processes. Water covers about 71% of earth's surface [1].

I feel adequate supply of good quality water to rural areas and poor regions of the world is a much bigger challenge than even energy availability. This is an area where engineers and technologists can play an important role and thus there is a big scope for infrastructure development in water-related issues.

With the coming of the Green Revolution to India in the early 1960s there has been an extensive use of water, resulting in shortages in some parts of the country. India has the highest rate of ground water usage of any country in the world [2]. Not only is there a water shortage, but lack of clean potable water results in millions of deaths every year due to diarrhoea and other diseases. This is despite the fact that there is enough rainfall. Every year India receives ~ 4000 billion cubic meters of rainfall, whereas the present yearly water consumption is only 650 billion cubic meters, or 16% of the total rainfall [3]. Theoretically we have enough clean water, but the rainfall is not evenly distributed over India and it comes in short spells, thereby pointing to the need for rainwater harvesting and storage programs.

The issue of rainwater harvesting and its supply to the communities in rural areas raises a question of who will own the water bodies. This is a touchy issue that quite a few developing countries are grappling with. I feel there is a need for the local governments to develop policies so that

rural water utilities can be set up by private players to harvest the rainwater, store and clean it, and then supply this water to a village throughout the year. These water utilities may also be able to buy water from the government through the existing canal system thus ensuring year round water availability even when the rains fail.

Presently, most of the water utilities in India are owned by the government and this leads to corruption in supply of water and its very inefficient usage. In 2003, the Government of India passed a revolutionary electricity act allowing for the first time the private players to produce, sell and distribute electricity anywhere in the country [4]. This act has allowed power producers to break free from the clutches of inefficient and corrupt government power utilities. A similar water act may help in the efficient supply of water to rural areas.

However, for this program to move forward there is a need for large scale deployment of qualified engineers and technicians who are trained in rainwater harvesting and other water-related technologies. Rainwater harvesting technology and management should be a compulsory minor in all engineering and agricultural universities and colleges. This will help not only in agriculture but also in watershed development.

All the fresh water supply on earth is ultimately solar-powered. Solar energy evaporates sea water which after condensation in clouds comes down as rain.

Thus mankind has developed technologies which duplicate this process of converting sea water into fresh water via evaporation and then condensing it for drinking and other uses. Middle Eastern countries which are flush with oil use it for desalinating sea water. In fact total desalination capacity installed in the world till today can theoretically supply about 13% of world's population with all their drinking water

requirements [5]. Presently these desalination units supply water needs of only 1% of world's population.

At our Institute NARI over a period of time we have developed some innovative solutions to water crisis [6]. They include solar energy powered desalination system; dew condensation for large scale water supply; solar-powered water production from soil for tree plantations, among others.

Near the shoreline the air is very humid and this humid air, if condensed, can produce huge amount of fresh water for the coastal communities residing there. Nature already has evaporated the sea water so that the energy required for evaporation can be saved. I feel that large scale dew condensation on seashore or on floating dew condensation plants in the ocean can provide all the water requirements of these countries [7].

Supply of clean drinking water using nature's help like rain water harvesting and dew condensation can provide a sustainable solution to water crisis.

This article was published in June 2019.



37. How noise pollution is affecting our health

Last week a person who gives out on hire his Dolby music truck for marriages and other functions used a vacant plot near our house to test his equipment. The heavy dose of bass that he blasted from his truck towards our house made me sick to the core. Such loud music is a common occurrence in cities and small towns of India, more so during the various religious festivals like Ganpati, Dussehra etc. This noise pollution is further exacerbated by firecrackers during Diwali and marriage festivals.



Similarly, some years ago I had gone to attend a friend's son's marriage in Mumbai. The drums were beaten so loudly that it caused palpitations in my heart and despite completely covering the ears with my palms, the noise penetrated deep inside the body, and I suffered a momentary loss of hearing.

Noise-wise, India is one of the most polluted countries in the world. The data on noise pollution is scarce, but whatever little exists for India shows that in most cities the noise reaches dangerous levels [1]. Sound levels or noise levels are described in decibels (dB) with a logarithmic increasing scale, and they double up with every 10 dB increase. Thus, the noise loudness level at 40 dB is twice as that at 30 dB. Sound level of normal human conversation is between 40-50 dB and that of rock or loud music concert is on an average 140 dB. Thus, the rock music is approximately 500 times louder than the human conversation!

Recent data shows that some of the Indian cities have noise levels greater than 75 dB [1] and in the peak traffic jam the deafening sound of horns blowing can reach 100-120 dB! Poor traffic sense, lax patrolling by police and bad roads exacerbates the noise pollution further. Medical data also shows that around 6-7% of India's population is deaf though the actual numbers may be much higher since most people never get tested for deafness [2].

Effect on health

Scientists have shown that all sound levels greater than 85 dB are dangerous to human health [3]. In the long run they damage hearing and increase the level of stress [4]. Large scale studies all over the world have shown that increased sound levels cause elevated blood pressure, loss of sleep, increased heart rate, cardiovascular constriction, and changes in brain chemistry. I feel the increase of anger and aggression in the city population is probably due to stress caused by noise pollution.

We hear sound through our ears where the pressure waves (sound) are converted into electrical signals and these signals are processed in the auditory centers of the brain. However, when the sound is loud enough it also has the ability to pass through the human skull - the thinnest among all animals and reach the brain directly.

Various scientific studies worldwide have shown the effect of mechanical forces on the working of brain [5]. Under various mechanical stresses brain chemistry gets altered, thus affecting neuron communications and general functioning of the brain. Loud noise vibrations passing through the skull can therefore easily affect the brain - the softest tissue in human body. In some ways, the effect of very loud sound may be similar to head trauma injury.

Nature has evolved so as to consider all the forces impinging on a body and I am sure that this pressure wave passing through the skull affects the brain directly.

Music-which is a sound, affects humans profoundly. Great music lifts the mood, is a balm to the soul and can have profound effect on the wellbeing of humans in the long run [6]. We still are not sure how music affects the whole brain since the auditory centers occupy only a small portion of brain. However sound vibrations creating mechanical stresses in the brain may provide an answer.

Similarly, “ugly and loud” sound may affect the whole brain and in the long run may have profound detrimental effects on human health. Even music, which may be soothing at low volumes, becomes cacophonous when played loudly.

Loud music has the same detrimental effect on nerves as multiple sclerosis [7]. It destroys the insulation of nerve cells which go from ear to the brain. It is not necessary that only loud music heard in the open-air affects our health; even headphones with loud music has the same effect.

I feel the stress, foul mood and general aggressiveness comes from continuously being exposed to loud music. The young population which is constantly chatting or hearing music via headphones is very susceptible to this phenomenon.

Another way by which sound pollution affects our health is by creating sleep deprivation. Because of sound pollution at night, we do not get deep sleep. Studies world over have shown that without deep sleep the detoxification of brain does not take place thereby creating long term stresses which affects all aspects of mental and physical health [8].

Studies have also shown that not only human but also animal health has been adversely affected by sound pollution [9]. The beaching of whales and dolphins has been linked to Sonar experiments during various military exercises in oceans around the world. Similarly, biologists have found urban noise pollution affects adversely the communication signals of songbirds.

What can be done?

The most important thing in fighting noise pollution is getting good data on it. Today there are innumerable sound-meter apps which can be downloaded on smart phones. This can make every person a mobile sound meter who can measure sound levels at any place.

Thus, wherever we go and find the noise levels loud enough we should record them on our smart phones and upload them to a suitable centralized site. This can very rapidly help create a sound- pollution map of the country.

Based upon this map good noise abatement legislation can be formulated with very strict laws to limit the sound levels. The Indian judicial system takes ages to bring to justice cases and thus a much faster mechanism needs to be developed to curb the noise pollution. Maybe heavy fines on the spot will deter noise polluters. I am sure other effective methods can be devised to curb this pollution once all of us become aware of this nuisance.

We just celebrated our 70th Independence Day. However, I feel the true independence will be when we get freedom from noise pollution. Then only will we get on the path of emotionally happy and sustainable living in India.

This article was published in August 2016.



38. Mental peace and cell phones!

Around six years ago a student from IIT Kanpur came to our research Institute for 2-3 months' internship. We are situated in rural Maharashtra and in those days did not have either a good internet or cell phone connectivity. Couple of days into his internship he found out one day that there was no signal in his phone. He simply went berserk and would come to my room every 10 minutes asking whether I can call the local phone people to restore the signal. Observing his obsessive behavior, I was at a loss on how to react and soon realized that he suffered from tremendous insecurity and thus felt that by not being able to talk to his friends he was missing out on something. His behavior was almost like that of a fish out of water!

This behavior is not unique and is now commonly seen in most youngsters. All over the world the desire to chat, text and take photographs is so intense that almost every waking minute a person is glued to his/her cell phone or internet. This itch to use the cell phone all the time has become a nuisance and a hazard not only in India but all over the world.

Why have we become such compulsive users of cell phones?

A part of this phenomenon could be explained by the fact that brain reacts to two most important inputs – sight and sound. Both these inputs take primacy in the brain over other sensory signals. Thus, the ringing of the phone and the flashing message are very difficult to ignore. Also, the loud tone very close to the ears either through headphones or cell phone has a mesmerizing effect on the brain.

However, I think a major reason for this malady is the insecurity which leads to the fear of a person on “missing out”. This insecurity is a part of an ever-expanding mental spiral – with the inability to analyze and evaluate the information, a person simply keeps on reacting ever more to input signals.

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The information over-load from cell phones, internet and TV is making us capable of only reacting to events rather than sit calmly and analyze them. This is almost like an animal behavior where they only react to inputs. The difference between humans and animals is the ability of humans to use their big brain to effectively process and digest the information. I somehow feel that we (specially the youngsters) are losing this ability.

This has serious repercussions on the future wellbeing of society since we are raising generations of young people who only know how to react. This is already seen in the explosion of social media like Facebook, twitter etc. where without their ability to analyze and think deeply youngsters react to any rumors or gossip in an immature way.

Cell phones and internet are very useful devices and have made a difference for better in the world. However, they are tools of communication and information, and we should not become their slaves. Technologies are for our benefit and use and we should be their masters and not their slaves. Thus, the use of electronic communication can be moderated through discipline so that we allow our minds to absorb and digest the information rather than be overloaded and overwhelmed by it.

For starters, we can be off internet and cell phones for one day in a week. This day can be utilized to just sit and talk or read and do some other activities which allow us to interact actively with our environment. This is the message I have been giving for last many years in inspirational talks to youngsters all over India.

Mahatma Gandhi understood this power of silence long ago. He used to have *maun vrat* (vow of silence) once a week so that he could think, reflect, and write. He was on to something that the present generation will do well to emulate.

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The reaction response to inputs and information overload is also creating nonsocial individuals. Last year I gave a talk to IIT Kanpur (my alma mater) students. In my interactions with them I found out that most of the students, though they were living in adjacent rooms or in the same hostel, would spend their time chatting on the phone or interacting with each other via SMS or chat / email message through the internet. They seem to be losing the ability to carry out face to face social interaction with their friends. This creates strange situations and sometimes leads to loneliness. And in some cases, especially for introvert students pushes them towards suicide.

A face-to-face interaction no matter how unpleasant it is does help to let the steam out. Unfortunately, the cyberspace technology has not been able to transmit fully yet the human emotions!

Thus, for youngsters and others here is the message. Switch off the cell phone, TV, and internet for one day in a week; relax, read, talk and do some physical activity and the world will not stop. Sun will still rise from the east at the same time and more than that the “silence of electronic information” will give you mental peace and help you to better cope with your anxieties and insecurity.

This article was published in September 2012 and was probably the first to highlight the problems of cell phone dependency. For many weeks it topped the most discussed article on TED conversations.



39. Wholesome food for rural poor

In every religion, culture and civilization feeding the poor and hungry is considered one of the most noble deeds. In Hindu religion one gets tremendous *punya* and good karmas by feeding the poor. In fact, one of the rituals in *Pind Daan* is feeding the poor so as to free the spirits of one's ancestors.

However, such large-scale feeding will require huge investment both in resources and time. A better alternative is to create conditions by which proper wholesome food is available to all the rural poor at affordable price. Getting this done will be the biggest charity!

Most of these rural poor are landless laborers. After working the whole day in the fields in scorching sun they come home in the evening and have to cook for the whole family. The cooking is done on the most primitive chulha (wood stove) which results in tremendous indoor air pollution. Many of them also have no electricity so they use primitive and polluting kerosene lamps. World Health Organization (WHO) data has shown that about 300,000 deaths/year in India can be directly attributed to indoor air pollution in such huts. At the same time this pollution results in many respiratory ailments and these people spend close to Rs. 200-400/month on medical bills.

Besides the pollution, rural poor also eat very poor diet. They buy whatever is available daily at Public Distribution System (PDS) shops and most of the times these shops are out of rations. Thus, they cook whatever is available. The hard work together with poor eating takes a heavy toll on their health. Besides this malnutrition also affects the physical and mental health of their children and may lead to creation of a whole generation of mentally challenged citizens.

Poverty to my mind is not an absence of material goods but not getting enough wholesome food. We are what we eat!

Rural Restaurants

So, I feel that the best way to provide adequate food for rural poor is by setting up rural restaurants on large scale. These restaurants will be similar to regular ones but for people below poverty line (BPL) they will provide meals at subsidized rates. These citizens will pay only Rs. 10 per meal and the rest, which is expected to be quite small, will come as a part of Government subsidy. Our calculations show that this subsidy will be only Rs. 2.50/person per meal.

The buying of meals could be facilitated by the use of UID (Aadhar) card by rural poor. The total cost should be Rs. 30/day for three vegetarian meals of breakfast, lunch, and dinner. With an average wage of laborer being Rs.100/day the meals cost will be ~ 30% of his wages.

Since the food will not be cooked in huts, this strategy will result in less pollution in rural households thereby reducing women's chores, which can be used in gainful activities like teaching children. These restaurants will also provide meeting place besides giving nutrition and tasty food

Eating in restaurants will also require fewer utensils in house and hence less expenditure. For other things like hot water for bath, making tea, boiling milk and cooking on holidays some utensils and fuel will be required. Our Institute NARI has developed an extremely efficient and environment-friendly lanstove [1] which provides simultaneously both light and heat for cooking and hence may provide the necessary functions.

Cooking is a luxury for rich and upper middle class. For rural and urban poor, it is a chore and a misery. Hence subsidized meals in rural restaurants are a necessity for these people.

How can this be done?

Providing reasonably priced wholesome food is the basic aim and program of Government of India (GOI). This is the basis of their much-touted food security program. However, in 65 years they have not been able to do so. Thus, I feel a public-private partnership can help in this.

To help the restaurant owners the GOI or state Governments should provide them with soft loans and other line of credit for setting up such facilities. Also, corporate world can take this up as a part of their corporate social responsibility activity.

McDonald's-type restaurant systems for rural areas can be a good model to be set up for quality control both in terms of hygiene and in terms of quality of food material. However, focus will be on availability of wholesome simple vegetarian food.

More clientele (volumes) will make these restaurants economical. Existing models of dhabas, Udupi-type restaurants etc. can be used in this scheme. These restaurants may also be able to provide midday meals in rural schools. At present the midday meal program is faltering due to various reasons.

Cooking food in these restaurants will also result in much more efficient use of energy since energy/kg of food cooked in households is greater than that in restaurants. The main thing however will be to reduce drastically the food wastage in these restaurants.

Rural restaurants can also be forced to use clean fuels like LPG or locally produced biomass-based liquid fuels. This strategy is very difficult to enforce for individual households.

Large scale employment generation in rural areas may result because of this activity. With an average norm of 30 people employed/100-chair

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restaurant, this program has the potential of generating about 20 million jobs permanently in rural areas. Besides the infrastructure development in setting up restaurants and establishing the food chain etc. will help the local farmers and will create huge wealth generation in these areas.

In the long run this strategy may provide better food security for rural poor than the existing one which is based on cheap food availability in PDS – a system which is prone to corruption and leakage.

In India huge donations are given both in cash and kind to temples. Thus, most of the temples are very rich. It will be better if somehow these donations can be channeled to create rural restaurants. This will help assuage the feelings of the giver and at the same time provide food to rural poor. The blessings of the rural poor to my mind will be far more powerful than those of the gods in temples!

This article was published in May 2012.

A lecture on this article was given at Bill and Melinda Gates Foundation meeting in New Delhi in June 2012. The ensuing publicity and presence of Tamil Nadu health officials in my lecture probably led to starting of Amma Unavagam and later on Shiv Bhojan in Maharashtra.



40. How to improve the life of farmers?

All of us irrespective of our financial situation need food to survive. We cannot eat nuts and bolts or software but only food. Hence for our survival food is the most important thing.

And yet we hardly give a thought for farmers who provide us food. Hence, we do not give adequate compensation for the farm produce with the result that farmers' situation in the country is really bad which ultimately results in their suicides and farmers unrest. Recent events of farmers agitation all over the country attests to this [1]. Farming today is completely nonremunerative and no farmer's children would like to go into farming. This decline of farming community will have a serious impact on farm productivity and may imperil our food security.

In order to alleviate the crisis on farm front, it is necessary that we should think about and debate the mechanisms by which farmers are adequately compensated for their labor.

For this to happen we need to calculate the correct price of farm produce. Presently the prices of food grains and other farm produce are decided by minimum support price (MSP) given by Government of India (GOI). However, this is only valid when the GOI procures and lifts the grains and produce from mandis. With over-flowing and rat-infested government godowns this mechanism of procuring grains at fixed prices is non-functional and collapsing under its own weight. Secondly only a few food grains are procured by GOI and hence fixing MSP for various commodities has no meaning. The prices of farm produce are therefore mostly fixed by middlemen who buy and sell the commodities in mandis. It is just like share market where the actual price of commodities has no relationship with the cost of production and their utility. It is more of a gambling.

I would like to propose a novel pricing structure which is based on the importance of food in our lives and also based on the amount of energy spent in producing them.

Basis of calculations

When we go into an average restaurant we do not think for a minute or bat an eyelid when our bill comes to Rs. 400-500/head. We normally eat 300-500 g of food, and this translates to our paying on an average Rs. 1000 for one kilogram of food consumed! And yet an average farmer gets only Rs. 15-20/kg for his produce [2].

Since our survival and well-being depends on food we eat, we should seriously think of giving at least 7-10% of restaurant bill back to farmers as cost of their produce! This should bring cheers to the farmer's life. Thus, all farm produce (grains and oilseeds) should be priced between Rs. 70-100/kg. This costing is not far-fetched and is borne by other calculations as well.

Around 85% of the farmers in India own less than 2 ha of land [3] and the average land holding is about 1.18 ha from which he/she produces mostly cereals and oilseeds. Thus about 80-85% of cropped land area in India is used for growing food grains and oilseeds whereas only 6-7% is used for fruits and vegetables [3]. The prices of grains and oilseeds fluctuate anywhere between Rs. 16-35/kg and are wholly inadequate to make farming remunerative. From his 1.18 ha a farmer earns anywhere between Rs. 70,000 to 80,000/year. For raising a family of 4 or 5 this is wholly inadequate.

Another peculiar aspect of farming is that the farmer gets remuneration for only 25-40% of his produce (grains, seeds, fruits, etc.). The rest 60-75% (bulk of his produce) are residues which are mostly burned in the fields. The farmer needs to be compensated for it since all the farm inputs are used up in the residue production also. The residues can be used for producing energy [4] (via combustion and digestion) or excellent fertilizer via

composting it. With proper pricing a farmer can earn about Rs. 15,000/ha per year from residues alone. This can increase his income to almost Rs. 90,000/year which is still inadequate and in poverty regime.

Average wage of a factory worker in India is ~ Rs. 400-500/day. He or she spends 7-8 hours doing physical work. These factory workers mostly produce white goods such as cars, two wheelers, smart phones, refrigerators, etc. We define our quality of life by owning variety of such goods. Farmers who produce food, which is far more important than white goods, should be at least paid factory wages. In fact, farmers do much harder work while standing in the sun and work for longer hours than the factory workers and yet are paid much less. Hence with factory wages norm the farmer family (husband and wife) income can be Rs. 3.6 lakh/year. On an average the yield of grains/oilseeds combination from a marginal farm is 2000 kg/ha per season [5]. So, for two seasons and from 1.18 ha a farmer can produce ~ 4720 kg of food grains/oilseeds per year. If the factory wages are given to him then it will translate into ~ Rs. 76/kg for his produce.

We can also calculate the produce cost by considering the energy cost of farming as compared to that of white goods. On an average the energy of producing white goods is ~ 55 MJ/kg [6]. Calculations show that we pay on an average Rs. 10-20/MJ for white and industrial goods. I feel we should give the same payment for the most essential item - the food. The specific energy for food grains and oilseeds production is around 6-8 MJ/kg [7] and with white goods energy cost of Rs. 10-20/MJ applied for food we again arrive at price of around Rs. 100/kg for food grains and oilseeds! Thus, I feel that MSP for food grains and oilseeds should be around Rs. 100/kg and should be raised periodically based on inflation.

How should the farmers be compensated?

Most of the farm produce is sold through auctions in mandis all over the country. The traders then ship it all over the country depending on the demand. Fruits and vegetables are also sold through these mandis, but as

they are perishable items hence are generally consumed in nearby areas. Besides their quantities are much smaller as compared to that of food grains.

GOI can play an important role of a being a regulatory authority in these mandis so that the middlemen are forced to buy the produce from farmers at MSP or at enhanced rate of Rs. 100/kg. It is not an easy exercise, but a regulatory structure may force the traders to comply. The cost of production of farm produce is dependent on local factors and hence MSP should be fixed locally at state level. A general country- wide MSP is not very useful.

GOI gives a subsidy of about Rs. 7.6 lakh crores to the weaker sections of society. This subsidy includes that given for PDS, LPG, electricity, fertilizer, kerosene, MNREGA [8], etc. and also includes periodic farm loans write off [9]. Very little of this subsidy (25-30%) actually goes to the poor people and most of it is siphoned by corrupt officials and system.

I feel that the entire subsidy should be given to the farmers directly through bank transfers. Farmers are the engine of growth. With their increased income **they can also provide employment to the poorest of poor landless laborers in rural areas.** This direct payment will also induce those farmers who presently are not farming to start farming again. Cost calculations show that payment from subsidy together with their present produce will give the marginal farmers an income of about Rs. 1.5 lakh/yr. This is almost half of what they will get if they are given factory wages but still it is a start.

There are also estimates that GOI gives sops, tax write-offs, etc. to corporate sector to the tune of Rs. 5.32 lakh crores/yr. [10]. The corporate sector has not been shown to be a paragon of virtue and their growth is quite slow. Besides this “subsidy” only benefits a few. If this subsidy is diverted to the marginal farmers, then their total subsidy can become nearly Rs. 13 lakh crores/yr. (7.6 + 5.32).

According to the latest GOI figures these are close to 100 million individuals with farm holdings of less than 2 ha [3]. If all of these farmers are given the total subsidy of Rs. 13 lakh crores/year; the average income of a marginal farmer from subsidy and produce will be about Rs. 2 lakh/yr. This is similar to what an average sugarcane farmer gets presently from his farm. Such income will bring in cheer to the marginal farmer.

The wealth of a country comes from its land. Around 55% of India's population is connected with farming. If the farm income can be increased by the above mechanism, then it can benefit a huge chunk of the population and can have a multiplier effect on the Indian economy.

Too often politicians in recent past have said that farmers should do something else besides farming to alleviate their suffering. This is a cop out and a lazy person's statement. In fact we should double our efforts in making farming modern through precision and container agriculture so that the productivity and income from the farm increases [11,12].

Also, it is worth pondering on the fact that for majority of farmers, farming is a way of life. Even if they are given an alternative employment they prefer to farm and if given adequate income they will be happy to do so year after year. After all, producing something from the land is a very creative and enjoyable act.

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41. Stopping corruption for reducing greed

On Sunday 28 August 2011 Anna Hazare broke his 13 days fast amidst great jubilation at Ramlila Grounds and elsewhere in the country. Most of the media and some of his associates called it a major victory for fighting corruption while others termed it as a shallow one and a circus with no promise of strong Jan Lok Pal Bill in sight. The truth lies somewhere in between.

Nevertheless, one tangible outcome of Anna's fast was that it brought into forefront the public anger against corruption-something that was long known but was simmering below the surface. It also allowed youth to be a part of a national movement-something they had not done before for a long time.

However, a sad aspect of this *tamasha* was the capitulation of a weak and inept governing leadership and its confused response to Anna's movement. Thus, the so called "mass movement" fueled by media frenzy was able to dictate and force some sort of action from the Parliament without MPs doing due diligence. This taste of blood may open up a Pandora's Box and in future similar agitations may force other issues to be passed in hurry in the Parliament.

The first casualty of corruption is governance. In a democracy due diligence and debate in the Parliament is the only way to bring in changes and new laws. Because of lack of governance the Parliament has ceased to function in a mature and sensible way and hence the general anger and frustration of common people and team Anna.

I feel corruption cannot be stopped only by making better and harsher laws. There are already enough laws to stop corruption provided they are implemented properly – something that can only happen when there is proper governance. A better way to reduce corruption is for each of us to

look inwards to reduce our greed. With reduced greed and better implementation of existing laws corruption can be effectively capped.

Besides fueling corruption, greed for resources and materials is also creating an unsustainable lifestyle. For example, most Indians aspire to have a lifestyle of western nations which is consumptive, energy-intensive, and unsustainable. In the U.S. the per capita energy consumption is 350 GJ/yr., whereas in India it is a low of 18 GJ/yr. If each citizen of India tries to live an American lifestyle, then the whole world's energy and material resources will be needed just for India.

I believe an emotionally satisfying and decent lifestyle is possible with much less energy consumption of 40-60 GJ/person/yr. or one-seventh that of the US [1]. This type of energy consumption will put much less pressure on earth's resources and reduce substantially the environmental pollution. However, this can be possible only if we reduce our greed by becoming spiritual and follow the maxim of "simple living and high thinking".

So, what is the basis of greed and how can it be reduced?

The basis of greed is desire. Desire manifests itself in different forms like lust, aim, ambition, control, goal, etc. However, the driving force is the same – power, fame and money and I think it ultimately boils down to control and hence power.

As our brains develop right from our birth, the fast-expanding neuron numbers have to form memory pathways. This process is accomplished by sensory perception where the inputs from the senses help form the memory. We are therefore hardwired to increase our experience and memories, and this is the basis of desire.

One of the outcomes of desire is possession. We feel a need to possess whatever we desire whether it is a person, object or even an idea. Possession

helps in maximization of experience. As we absorb “experience” through our senses, the brain processes this information. It is during this process that we “decide” whether our desires are fulfilled or not. Fulfillment of desires therefore helps us in releasing the “possessions”.

Unfulfilled desires lead to frustration and a need to be more possessive. This leads eventually to more control and greed which is the major cause of corruption.

Desire is a useful and necessary emotion. It allows us to achieve something and be active. Without desire we will be lifeless, dead or like stones. However, what we need to do is to satiate or channel our desires so that they get fulfilled without too much taxing of resources, materials, and energy.

A powerful processor or the mind can get its desires fulfilled quite easily without physically possessing the objects of desire since it can effectively evaluate all choices and resolve issues regarding consumptive lifestyle. For example, we can wear only one shirt and one pant at a time so what is the need to have 100 shirts and pants?

Similarly, we can live in one house or drive one car at a time. So, what is the need to have many houses and a dozen cars? A powerful mind can resolve these issues and help us lead a sustainable lifestyle. While on the other hand a weaker brain needs to possess a lot more things for fulfillment of desires and this leads to greed.

When one concentrates on a single thought regularly and continuously for a long time it helps in producing a powerful mind and is the essence of Yoga. Such a powerful brain or processor allows us to think deeply and concentrate during which we can get “lost” in processing that information. Such a mind also makes us sensitive and humble, changes our priorities in life and helps us in focusing on getting personal happiness through mental

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peace rather than satisfaction of material needs. Besides such a mind reduces our insecurities and hence gives us a feeling of calmness, wellbeing, and happiness [2].

The insecurity of human beings comes when they have nothing to do. “An empty mind is the devil’s workshop” is an old saying. Thus, activities such as hoarding of wealth and material goods are the result of a shallow mind since it is driven by fear complex of losing out or not having enough.

A powerful and a sensitive mind also becomes empathetic to its surroundings and gives rise to the desire to give back something to the society and help less fortunate fellow beings.

I believe that the whole purpose of our existence is to increase personal and societal infrastructure. Personal infrastructure includes personal health, happiness, and general wellbeing. By improving our personal “infrastructure” we become better human beings and it helps in our emotional growth and evolution. By giving back something to the society so that its “infrastructure” increases we help in mankind’s evolution. Both these activities when carried out simultaneously can give us a great joy and satisfaction.

Creation of powerful mind should start from childhood when the brain power is at its peak. Thus, we should consciously create in our children from very early age the desire to read which will help them cultivate the habit of imagination and daydreaming. This will help make their minds powerful and with focus on reading, thinking and contemplation we can create better human beings who will form a gentler and more sustainable society. A small individual step for a corruption-less society therefore should start with school.

Though all members of our society need to reduce their greed for better India, corporate world has a bigger responsibility for reducing corruption.

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Today they are presented in pretty poor light and are considered as fueling corruption by colluding with politicians in land grabbing, shady deals, and parking of their ill-gotten wealth abroad, among others.

With their resources and wealth, the captains of the corporate world can create conditions for jobs generation and improving the quality of life of rural poor. For this they need to reduce their greed and not get caught up in the number games such as biggest jets, highest turnover, maximum profit etc. etc.– something they can remove by cultivating a powerful processor or mind.

The corporate world can also take lessons from history of the freedom movement where major industrialists of India whole heartedly supported Gandhiji's program by providing intellectual and financial capital to it. There were many greedy industrialists and people with means during Gandhiji's time also, but he gave them a higher purpose in life of being a part of freedom movement [3]. This helped a large population sublimate their greed for getting independence for India. I think helping the 60% rural population to improve their quality of life could be a new higher purpose.

I therefore feel that when all of us become internally secure and reduce our greed then we can give something back to the society and lay the foundation of a sustainable and corruption-less India.

This article is based upon my public lecture entitled “Sociobiological basis of corruption – relevance for corporate world”. The lecture was given in Pune on 9th August 2011 [4].



42. Giving back to society brings happiness

In the ancient Indian tradition, a person was supposed to go through four phases of life; *Brahmacharya* (education); *Grahastha* (raising family); *Vanwas* (going to forest for contemplation) and *Sanayas* (getting detached from all activities and preparing for death). Each of these phases was of about 25 years duration since ancient Indians believed that life span of humans was about 100 years.

The above system was also based on the principle that the purpose was to live a decent life based on *Dharma* and to increase the progeny. Once this was done then the purpose was over and *Vanwas* followed by *Sanayas* was the ultimate end.

I think in the present connected and global world an important aspect of good life is to give something back to the society. Not only giving back to society helps the less fortunate citizens but also gives a tremendous sense of satisfaction and happiness to the giver.

Nevertheless, giving back to society should be based on individual's capacity and capability. For that he/she should live a happy and joyful life according to the following four phases:

1. **Absorption phase:** This phase is similar to *Brahmacharya* and may last anywhere till the age of 25 to 30 years but with a peak of around 20-25 years. This is the phase when an individual absorbs knowledge, experiences, and information. This is the most important phase of one's life because what we become and will do later on is formed and decided during this phase. It is my belief that the basic template of a person's personality is formed by the age of 16. Experience of later years simply adds or subtracts to it. Also, as our brain is at its peak, we are hungry for the experience and the quality of experience decides what type of individual we will become. Thus, the quality of schooling, the peer

pressure and the environment play an important role during these formative years.

2. **The Evaluation phase:** This phase sometimes runs concurrently with the absorption phase and peaks at the age of 30-35 years. During this phase the person is evaluating various options for his/her future life. He/she will raise the family, is looking for options of where to take his life and this phase is generally characterized by ambition and desire to do something.
3. **Consolidation phase:** This phase lasts from 35 to 55 years of age. Once the course of action by an individual in evaluation phase is nearly fixed then comes the phase of consolidation and building a whole body of knowledge and wisdom. This phase is also characterized by ability to get wisdom or *vivek* which dictates a person's desire to give back to society. This is a very critical phase since the experiences gained based on a person's capabilities and outside influence decides whether a person becomes internally secure or insecure. An insecure person will only be interested in hoarding and accumulating and hence will not give back to the society.
4. **Dissemination or donation phase:** This is a phase which lasts from 55 years and onwards and really differentiates the boys from men. The people with wisdom and those who are secure want to give back to society according to their abilities. Hence money, knowledge and resources are freely given for the common good. This giving back gives a new purpose to life in old age.

I believe that those people who give back to the society are the happiest and the most contented and can leave this world as happy human beings knowing fully well that they have contributed to betterment of mankind.

This article was published in December 2012.



43. India Needs a New Quit India Movement

My father went to jail in the 1942 Quit India movement. He was interned for 2.5 years in Delhi and Lucknow jails and was released in 1946.

I often used to ask him whether he and hundreds and thousands of Indians like him who sacrificed their lives for India's independence ever thought that it will become such a chaotic and corrupt country and whether his sacrifice was in vain? We started with such a high moral ground in 1947 and where have we brought our country to? He used to fumble with the answer and was clueless about it.

This is the same question I still ask myself when giving lectures to youngsters in innumerable universities, IITs and other colleges. Yet these youngsters are the future of our country, and we should educate and inspire them to do better.

At the time when we are celebrating 75 years of Quit India movement and celebrating 70 years of independent India, we should perhaps give a new slogan for Quit India. Just like the original Quit India movement was to banish Britishers from India, so the new slogan should be to banish from India – **poverty, hunger, hatred, and violence**. Freedom from these will be true independence for our country.

How do we achieve this? Not by slogans or posters or twitter! But by solid hard work for changing India from bottom up.

Poverty can be reduced drastically by creating wealth from the land. When 55% of India's population is dependent on farming it is important that we focus very intensely on agriculture and improving the lot of farmers. Some of the poorest in rural population are farmers. By giving the farmers proper incentives and regulating the mandis so that the middle men give them good prices for their produce, Government of India can really help the farmers

increase their income and create wealth for the country [1]. Our survival depends on eating food and not nuts and bolts or software! Proper farming policy and its implementation can be the real game changer for the country and can be the biggest industry.

With increased food availability and wealth of the farmers, the issues of hunger can also be mitigated. India has the dubious distinction of having one third of its population malnourished [2]. A country which has a massive space program of sending the man to the moon and Mars cannot take care of its millions of malnourished citizens is really a matter of shame for all of us and needs introspection.

Hatred and violence are linked and come from the lack of resources and hence the desire to control them. These tendencies exist in all humans but when the resources get diminished, because of overpopulation or for other reasons, then the desire to control and horde them becomes strong. This leads to insecurity and ultimately to violence. The control is practiced in the name of religion, caste, belief, or anything which allows a group of people to indulge in violence.

Spirituality can reduce insecurity and helps us in becoming tolerant to others' points of view and hence less violent [3]. With increased wealth of the country, because of excellent farming, this tendency of control and hatred can be further reduced and checked.

At the same time there has to be a very conscious effort to teach good moral science and value system in schools [4]. Without the students right from school getting proper guidance on how to become good citizens, all the above solutions will not work. Complete overhauling of the schooling system, which presently is based on passing examinations, needs to be done. It should be more focused on imparting value-based education together with skill development.

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A true independence will be when we all work together to produce a sustainable and holistic India.

This article was published in August 2017.



44. Can India teach the world a new path?

It is a historical fact that India was the only country in the world which withstood the onslaught of Muslim conversion.

Every country in Africa, Europe and Asia fell to the Muslim conversion. But India which was occupied and ruled for almost 1000 years by Muslim rulers never became a Muslim country. Why was it so?

A probable answer lies in the higher quality of Indian spiritual thought. Though physically beaten by the external rulers they could not conquer the hearts and minds of Indians. Another reason could be that religion was a very personal matter for most Indians. They had a personal god based upon India's ancient tradition, which they were not interested in surrendering to the messenger of God!

I feel that there is a great lesson for the world from this history, especially at this time when world over the forces of ethnic killings, conversions and fundamentalists are on the rise.

We need to revive the ancient Indian philosophical thought. It is not a religion in the narrow sense but a celebration of humanity. The Indian philosophical thought as enumerated in Vedas, Upanishads and Patanjali Yoga Darshan transcends all castes, creeds and physical boundaries and that should be the guiding principle for our national and International discourses [1]. This together with high technology should be the Mantra of development for not only India but the world. I think this could be the basis of a new philosophy [2].

Every act of violence for ethnic cleansing brings the faith to the fore and the strong reaction to it forces the population to become even more fundamentalist. The whole basis of subjugation of one religion by another brings in greater misery and more radicalization.

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All religions control the hearts and minds of their followers mostly by coercive means. In fact, all isms and religions have been used for such control. The spirit of enquiry is missing in most of them, and their message is explicitly based on faith which is always blind.

The ancient Indian philosophical thought was based on spirit of enquiry where the guru only showed the way – the disciple had to find the goal. That is the higher form of thought process and is spiritual in nature rather than the dogmatic approach followed by all religions.

The hearts and minds of people in a non-violent way can only be captured by higher thought. No matter how criminal or evil a person is, he or she is always influenced by higher thought which is universal in nature. That is what the great personalities of world taught. They included Buddha, Christ, Guru Nanak, or the authors of Indian philosophical thought among others.

In India itself, the discourses of Adi Shankaracharya with Buddhist leaders show the path [3]. In a nonviolent way he discussed, debated, and defeated the Buddhist monks and priests and then brought them back into Hindu fold. He also handed their temples back to them showing his internal security that came from the knowledge that his thought was superior and hence he was not afraid that they will convert back to Buddhism. This winning of their hearts and minds through higher intellectual thought is the way forward in this time of ethnic strife and violence all over world.

Similarly, Mahatma Gandhi through his non-violent way won the hearts and minds of all Indians. He distilled the ancient philosophy of Gita and used it to raise the level of discourse to a very high level thereby achieving remarkable results.

However, for this transformation to happen we need large numbers of Adi Shankaracharya and Mahatma Gandhi who will understand the great Indian philosophical thought and then spread its message to the world. This

together with high technology should be our philosophy of development. This combination will allow us to live sustainably and efficiently and may give us a sense of purpose and an emotionally satisfying life [2].

Nevertheless, for the world to follow this strategy we have to first make it happen here in India. In the past all great thoughts from India went abroad after they were practiced in India for quite some time. Thus, there is a need for our own population to be tolerant about different shades of opinion. If we understand the greatness of our ancient philosophical thought, then we can remove our fears and insecurities.

The political implications of this strategy can be immense. China which got its Buddhism from India may yet get its new philosophy from India. With two of the biggest nations on the earth united by the great Indian philosophical thought the world can have a brighter future.

This article was published in January 2019.



45. Lessons from India's Spiritual Tradition



India has produced some of the greatest spiritual thought of mankind. The ancient spiritual thought was very scientific in nature and based on deep inquiry of truth. The *Upanishads*, *Patanjali Yoga Sutras*, *Bhagwat Gita*, etc., are part of that great tradition [1,2,3].

The ritualistic tradition of Hindu religion came later on when the spirit of inquiry degenerated. This degeneration of thought however provided an impetus for rejuvenation of India by creation of new thinking in the form of Buddhism, Jainism, Sikhism [4,5,6] etc. It was as if the old spiritual thought was washed and made clean by these new developments.

The degeneration of great thought took place when rulers started controlling people. Spiritual thought got converted into religion which allowed the rulers to control people and resources and the rituals and associated systems of the religion helped to increase this control.

Rituals help to create fear which makes it easy to control a person. For example, the rituals like, you have to pray so many times; have to give so much *prasad* to the temple; wear this ring or the bracelet; give so much material to a pundit are all part of the mechanism to control the person. Fear is put in the minds of people that if you do not perform the rituals then major calamity will fall on you. Fear is a powerful mechanism to control people.

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Throughout the history of mankind all “isms” are used to control population, whether it is religions or a system of governance. The authors of new thoughts did not control. It was their followers who used their ideas to create isms for control. They put fear either by physical or mental means. In the present scenario the fear of pandemic also came in very handy to a lot of dictators and rulers to control the population. This fear creation (either real or fake) by rulers throughout history helps them to divide and rule.

By nature, a very powerful brain will always seek the truth. The ultimate truth is beyond caste, creed, colour, country, etc. Old *rishis* who developed India’s great spiritual thoughts were people endowed with very powerful brains who lived in a rich and beautiful country like India. Once their basic needs were satisfied their minds soared to understand the universal truths. Thus *Patanjali*, authors of *Upanishads*, *Gita*, etc. were seekers of truth.

The ancient Indian spiritual thought always encouraged spirit of enquiry [1]. The guru helped the disciple by pointing and guiding him/her to the goal; the disciple then followed it based on his degree of application. There was no control exercised, just the guidance. It is this spirit of enquiry and seeking truth that is presently missing in our society. Somehow it has to be inculcated in our children and young adults.

India has always progressed economically, culturally, and emotionally when it pursued the path of spirituality and search for the truth.

Thus, it can be conjectured that the general prosperity in ancient India followed after a new spiritual thought came. The Mauryan empire, especially Ashoka, followed after Buddha; Harshvardhan empire was inspired by Adi Shankaracharya; Chola dynasty and the rise of the great Hindu Kingdoms of Southeast Asia including Angor Wat, came after Sage Ramanuja [7,8,9,10,11,12].

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This inspiration is visible in the wonderful architecture of the temples. I have always wondered about what forces shaped the lives of the workers who made the temples which took years to make – some even more than hundred years. It was not simply a paid job but a part of great thought and a mission which inspired and guided the workers. This made them proud of their creation and allowed the flow of high quality of craftsmanship.

In the recent past, work of NASA space program followed this process [13]. More than building the rockets it was the desire to win the space race against Russians and a greater desire to conquer space - the next frontier, that drove a lot of people to do wonderful work in NASA.

I also feel that the great thought of Mahatma Gandhi of non-violence and adherence to truth, which had fired the whole of India to win our independence, would have helped produce a great economic activity in the country if we had not followed the socialism route [14]. After all Gandhiji inspired industrialists like Birla, Tata, Bajaj, [15, 16] etc. to help in Independence movement and nation building and I am sure they and other industrialists would have continued with even greater vigour in this task if they had been allowed freedom to do so.

Similarly, the desire in each Indian to help build the newly independent India was very strong and when that desire did not get a proper outlet in the socialist structure then the enthusiasm slowly faded.

This can have some lessons for the present dispensation. Instead of following the unsustainable growth example of U.S. and China which is based on extreme greed and very materialistic outlook, we should follow our great philosophical and spiritual tradition and give the world a new direction of development based on the mantra of **“high technology guided by spirituality can produce sustainable development and happiness”** [17].

This article was published in October 2021.



46. India@ 73 – Musings of an Ordinary Indian

I was born in Lucknow, Uttar Pradesh (U.P.); three years after independence and so smelled the early fragrance of independent India [1].

My father went to jail for 2.5 years during the independence struggle and I am sure his fierce patriotism and sacrifices for India came into my DNA also [2]. My father Jagdish Rajvanshi was doing his Ph.D. in Hindi literature in Allahabad University in 1940 when Gandhiji's call stirred him, just like it did for lakhs of other students, and he joined the freedom struggle movement and was jailed for 2.5 years. In doing so he left a very lucrative career of a possible University professorship.

He was an idealist and somehow could not get into mainstream of politics which very rapidly degenerated, after independence, into producing corrupt politicians who were more interested in amassing wealth rather than governing and this process became a norm. So, an honest politician was called weak whereas a wheeler-dealer was called a “dynamic” leader.

Very briefly in 1975 he became a minister in Shri. H. N. Bahuguna's U.P. cabinet and was entitled to a car and bungalow but never left his Lal Bagh flat and would walk to Assembly (it was within walking distance) from our flat since he did not want to lose his habit of walking [3].

I think as India achieves the milestone of being 73 years old in next couple of days, we should reflect on these things on how from the heights of Gandhi-Nehru era of idealistic leaders we have come to the present sorry state where leaders are behaving like dictators, trying to create a rift in the society, breaking it along religious lines and where building the temple becomes the most important event for the country.

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My own journey from Lucknow schools to IIT Kanpur then to US and back to rural India reflects aspirations of an ordinary but proud Indian and in some ways mirrors my father's journey [4].

After my Ph.D. and teaching in U.S. for a couple of years I came back to rural India in 1981 partly because of idealism and partly because of arrogance [5]. At that time when very large number of bright students of India were going to U.S. I chose to come back to rural India. I felt that my knowledge of solar energy will help India and that I will change India. India is an ancient civilization and has a tremendous inertial mass for change and yet I was foolish enough to think that I will change it.

India did not change but it changed me. Working and living in rural India taught me humility and spirituality. Humility in the sense that I realized there are millions of problems in this ancient land which have to be tackled and it will take generations and also more than few lifetimes of struggle to change them.

Living in rural India also helped me simplify my life [6]. With hardly any avenues to spend money and availability of very few amenities, one starts living a simple life, which is the first step towards spirituality. Initially one may not like it but with time one starts to enjoy the benefits of a simplified life. I recommend such a life for anybody who believes in sustainability because when everyone becomes sustainable in their personal life, the world will automatically become sustainable. This together with my spiritual leanings and readings during early 1960s helped me on the path of spirituality [7].

Spirituality is the basic soul of India. ***Spirituality is not religion*** [8]. It is the state of mind that makes it understand that the Truth is beyond the barriers of worldliness, religion, caste, creed, race, or geographical boundaries.

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This is what our great ancient philosophical thought of *Yoga, Upanishads*, etc. has taught us and we seemed to have forgotten it and have gotten entangled in the ritualistic things like temple making and other similar acts.

Just like Buddhism, Jainism, Sikhism was born because the leaders of these religions revolted against the ritualistic traditions of the ageing and decaying Hinduism, similarly I feel there is hope that a thought based on India's spirituality together with modern high technology will form a new paradigm of development for India and the world.

In my work in rural India, I have touched on both these themes of spirituality and high technology and believe that Spirituality + Technology will bring us happiness and allow us to live a sustainable lifestyle. This is the theme I have explored in greater detail in the present book; *Exploring the Mind of God* [9].

Spirituality gives us wisdom to reduce our needs and greed; and high technology allows us to fulfil these reduced needs very efficiently. This combination can lead us to sustainability and create a wholesome and emotionally satisfying world.

The journey to this line of thinking started when at the age thirteen, I was given a birthday gift – a book “Autobiography of Mahatma Gandhi” (in Hindi) [10]. Reading this book changed my life and thinking. That book propelled me on the path of spirituality and with my training in engineering in IIT Kanpur and later in US, showed me how technology is very necessary to live a sustainable life [7].

And so, when I came back from U.S. in 1981 to rural India I felt that India was on the cusp of a new development model and in late 1980s and early 1990s hopes were high that India had broken its shackles of old thinking and was on a path of general economic recovery. Yet it also brought tremendous corruption and decay in the polity of the country.

Since then, there has been economic progress (increasing GDP) but the general ethics and morality of population and standards of political life have gone downhill and with ever increasing threat to democratic values.

Yet I feel there is hope. A country that has produced great leaders like Buddha, Ashoka, Adi Shankaracharya, Guru Nanak, Gandhi, etc. cannot be that bad. The genetic material of Indians is still the same. I feel the present set-up is an aberration and feel it shall pass. However, what is sad is that younger generation which is the future of the country, has stopped the discourse on and engagement with the story of India. They seem to be too preoccupied with their social media and activities related to it. ***Social media has somehow become today's opium of the masses.***

So, as we approach India @73 it is the duty of older generation like ours and who are attached to the story of India to engage the youngsters in India's development through spirituality and technology. How do we teach our children and make them excited about a great India which will have a different model of development based on our ancient philosophical thought; is a great challenge. Yet if we overcome this challenge then India can show a new path of development for itself and for the world.

This article was published in August 2020



47. Why is the world going through so much turmoil

Around four years ago in 2016 I had published a version of this article when the world was witnessing the rise of extremists, right wing fundamentalists, dictators and very undemocratic leaders in leading democracies of the world.

Thus we saw the rise of Donald Trump in U.S. (a rogue, liar and racist in an otherwise great country); Kim Jong-Un in North Korea; President Rodrigo Duterte in Philippines (another demagogue); President Xi Jinping of China (complete dictator); Vladimir Putin, another rogue in Russia; Prime Minister Narendra Modi of India (total controller bordering on dictatorial tendencies); rise of extreme right in Europe and rise of Muslim fundamentalist like ISIS, Al-Qaida, etc. in Middle East.

All these leaders are driven by the desire to have extreme control and exhibit unreasonable behaviour. And their actions point to the direction of creating chaos, violence and fear among the population - something akin to what took place in the world in 1930s just before World War II. This is also fuelled by easy availability of weapons and other warlike paraphernalia helped and aided by the industrial-military complex of major industrial nations.

And now COVID-19 pandemic has provided these leaders with god sent opportunity to further tighten their grip on power and their countries leading to turmoil and chaotic conditions [1].

Why has the world moved to such a perilous thought process? And what has happened to the sane and sober voices. There are worldly and other worldly reasons for it!

Among the worldly reasons, I believe, such behaviour is an outcome of tremendous insecurity among human beings fuelled by ever-increasing greed for resources and wealth [2]. Increased population pressures, stress of

daily life, increased expectations together with the need for instant gratification adds to the fear and insecurity of population.

It is also an outcome of mass scale instantaneous communication via internet and TV which creates a need to get instant feedback on social and other media. Thus most of the times people react to events rather than thinking deeply about them. This reaction leads to irrational behaviour, spreading of rumours and false information so that the eventualities are not thought of and evaluated.

Also, it seems that people with increased joblessness and poverty have very little to do and with easy access to internet and social media, easily fall prey to people who can control them for their ulterior motives. Whether it is ISIS or right wing extremists, it is only a handful of controllers who exercise great power through their financial muscles, internet and mass media. This exercise of power is fuelled by fear of losing control.

Now with COVID-19 pandemic another type of fear has come in the vision field of mankind. This fear is also being used by dictatorial leaders to further tighten the grip on events which unfortunately they are finding is out of their control. This is leading to quite a few irrational decisions of lockdowns, etc.

I however feel that this is a powerful way of nature telling all of us that our unsustainable lifestyle is not conducive for mankind's evolution and thus there will be many more pandemics like COVID-19 unless we mend our ways [3]. Nevertheless this has created havoc in the world of financial, social and political spheres with far reaching consequences for future.

The other worldly reason could be that Earth is passing through space which produces such upheavals in humans. Just like great discoveries and inventions have come periodically to humans, similarly we get these destructive tendencies and evil forces as earth passes through knowledge

space which is filled with memories from ancient civilizations having the ability to produce both positive and negative tendencies in humans [4, 5]. This out-worldly reason we cannot control but if we mend our ways of living sustainably and creating democratic and enlightened leadership then our world has hope [6].

One worldly way out of this predicament is to make work available for most of the population of the world. 'An empty mind is a devils' workshop' is an old saying - pointing towards the importance of work for everybody especially the young. Recently a very interesting though intriguing data from 70-80 countries show that anxiety levels increase when there is less work [7]. Thus, anxiety levels are inversely proportional to the number of hours people work per year. Good hard work which taxes our minds and is physically challenging will help us improve our immunity and will be good for body and soul.

Another way out is for the corporate world to reduce their greed so that they should go slow on complete automation of manufacturing process. This will make most of the workers redundant. This reduction in workforce naturally increases the corporate profits. This greed is further fuelled by ascendancy of industrial-military complex whose sole aim is to fuel wars all over the world so that their costly armaments are continuously sold.

What is needed is to increase the employment of population in high-tech agriculture, service industry and in sustainable and holistic processes where man-machine interface becomes the norm. This can be helped if the corporate world reduces its greed and spreads the wealth among its workers. In addition, an enlightened legislation, which allows people to negotiate the wages, rather than some pre-structured and government-controlled minimum wages, can further aid this process.

This article was published in October 2016.



48. How Sustainable Lifestyle Can Overcome Future Pandemics

Almost 45 years ago, when I was a student in US, I got an idea that probably through medicine mankind is doing disservice to itself by hindering in its evolutionary process [1].

Nature takes care of weaklings and most of the time they do not survive. Thus, the survival of the fittest - the main tenet of Darwinian evolution takes place [2]. However, we as humans disrupt this process by making life prolong through medicines though sometimes one wonders what quality of life it is.

I was ashamed by this thought since it went against all the definitions of empathy and humanness.

Yet now with COVID on us I feel that thought was correct since the present calamity is because of unsustainable lifestyle that we have been following and which has made us soft and thus has compromised our immunity. These viruses in one form or other have been with us for a very long time. It is only the person's strong immune system that can take care of them.

For every small ailment we pop a medicinal pill in our mouth and do not allow our body's natural immunity to fight it so that it develops and strengthens. In fact, indiscriminate use of opioids and other pain killers have made our immune system further compromised.

Pain is very beneficial for human body. It helps the brain send signals to the pain sensation body part so that appropriate chemicals are released to reduce the pain. This process strengthens the body's immune system.

However, when we keep on taking pain killers the immune system gets a hit and with time it gets lethargic and does not react in a timely fashion to the onslaught of virulent disease like COVID.

It has been observed that most of the patients of COVID are dying because of overreaction of body's immune system called Cytokine storm [3]. Cytokines are small proteins released by many different cells in the body to fight infection and trigger inflammation. When the immune system is not properly tuned and has become lethargic because of dependence on medicines then the chances of Cytokines storm increases.

Similarly, when we have even slight fevers we have the tendency of popping crocin tablets [4]. Fever is the way for the body to fight infection. When it gets lulled into inaction by external medicines like crocin it loses its ability to fight major infection.

Good ways to improve the immune system is to use homeopathy since it helps the body to fight disease rather than the disease itself [5]. Similarly, naturopathy also helps the system to fight disease. Both these systems of disease control are benign, don't have side effects and help the body in the long run to develop good immune system.

Naturally one of the biggest reducer of human immunity is the stress. Stress is an inflammation that results when the body and system fight all the time and in the process of this fighting, the general immunity of the body becomes less.

Whether the stress is because of lack of sleep, worries, fights or any other conflicts it creates fatigue both in our body and mind and has a tremendous negative effect on our immunity.

Our present competitive world also puts pressures on individuals all the time. Over achievers and ambitious people have more stress since they are

fighting to achieve their goals. Most of the times achievement of goals is a difficult task and requires considerable nervous and physical energies leading to stress.

This increased stress has been compounded by our unsustainable lifestyles. We have become soft and with ever improvement in technologies are getting lazier and obese. Scientists have long suggested that obesity is an inflammation of body and severely reduces our immune system [6]. Thus, with present lifestyle our immune system never gets stretched and tested and I have a feeling that in coming years and decades we will have many more such epidemics unless we strengthen our bodies and mind.

One of the best ways to reduce stress is by developing a healthy and emotionally stable brain. Large numbers of studies world over have shown that a healthy and emotionally stable brain helps keep the body healthy and reduces stress.

India Yogic system through the method of pranayama and meditation is one of the best methods to keep the mind calm. The practice of Sanyam as enunciated by Sage Patanjali where one concentrates on a single thought for a long time helps in focusing of mind, relaxes it and brings in general, happiness and peace.

Similarly vigorous physical activity in any form helps strengthen the body and in getting good sleep. Both these activities make the immune system strong.

This article was published in June 2020.



49. How I Try to Live in a Sustainable Manner

Almost a year has gone since COVID came into our life. It has created havoc in our personal, social, and economic spheres and it will take quite some time for us to recover from its effects.

World over it now an accepted fact that the attack of this virus was compounded and accelerated because of our unsustainable lifestyle [1].

We have become soft and with ever improvement in technologies are getting lazy and obese. Scientists have long suggested that obesity is an inflammation of the body and severely compromises our immune system. Thus with present lifestyle our immune system never gets stretched and tested and I have a feeling that in coming years and decades we will have many more such epidemics unless we strengthen our bodies and mind and reduce stress. One of the best ways to reduce stress is to live a simple, holistic, and sustainable life.

I have tried to live such a life for the last 35 years and would like to share my experiences. My experiment is not the final word on sustainable living. It is just a pointer and I am sure many readers may have even better answers and solutions.

I also feel that each one of us should live sustainably to conserve the resources of this world. The consumptive lifestyle of western societies is putting tremendous pressures on the world resources besides increasing earth warming and pollution. For example an average American consumes 306 GJ/yr. of energy [2]. If every citizen of this planet wants to have the wasteful and consumptive life style of an average American then we will need the resources of 4-5 earths to sustain us [3].

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My experiments in sustainable living for the last 35 years are as follows:

1. I live in a small rural town of Phaltan in Western Maharashtra [4]. It is about 800 m above sea level and is 100 km south-east of Pune or 300 km south-east of Mumbai. Its climate is very mild [5]. Still in some years during winters the minimum temperatures can reach 7-8 °C. Our house is not heated. We close the windows at night if needed and wear warm clothes and socks. It keeps us warm and comfortable.
2. I live in a house designed by me and constructed in 1984. It has 18” thick stone walls which allow thermal lag-time, so heating and cooling due to ambient atmospheric temperature is delayed. It is passively cooled in the summer by laying old jute gunny sacks on the roof and sprinkling water on them two times a day. These sacks are very cheap and cost Rs. 10/m². The evaporating water from the sacks cools the roof from where 80% of thermal load comes into the house [6]. Thus when the outside temperatures are about 40-45 °C the average temperatures of rooms range from 25-30 °C. This is mostly because of thick walls and cool roof. Besides, we also close all the windows and draw the drapes over them so that hot air and radiation from outside does not come inside the house. The trees surrounding the house also help.
3. In the last 2-3 years we had scanty rains in Phaltan and so there is drought like conditions. To mitigate that and keep the house cool without the use of water we have set up green shade nets over the roof. These shade net cost Rs. 150/m² and together with gunny sacks provide adequate cooling for the roof. Such simple cooling system has also been



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put on all buildings in our Institute. The Institute buildings are also stone structures with 18” thick walls.

4. This simple rooftop cooling system is a highly effective air-conditioning system, with very little energy and cost involved. The gunny sacks last for about two years, after which they need to be replaced, and the **water requirement is only 1.5 liters per square meter**. Costing done by us has shown that this system is one-tenth the cost of a regular electric air conditioning system, and when the electricity supply is irregular—especially during summer—the rooftop system provides a very cost-effective method of cooling the house.



5. In a couple of years or so the gunny sacks get worn out because of the salts left behind by the evaporating water. These old gunny sacks are either used as mulch in the garden or burned in our hot water boiler, which supplies water for our daily bath. The water boiler is a grate-type multifuel boiler with about a 10 m long chimney attached to it. This chimney height gives an excellent draught and hence burns the wood and other material quite cleanly. The ash from this boiler is used as a fertilizer in our garden either by putting it directly around the plants or in composting pit.
6. All our kitchen waste is composted in a pit (dimensions of 1 m X 1 m X 1 m) and within 2-3 months it provides excellent fertilizer for the garden.
7. Similarly at our Institute NARI we compost all the agricultural residues from our farm in four huge pits. The residues after crop harvesting are brought to the pits, chopped into small pieces by chaff cutter and then

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put in them. Periodic water spray and additions of cow dung helps to produce good compost in 3-4 months. Use of such farmyard manure has drastically improved soils of NARI farm.



8. We never waste any food in the house. Whatever we take on the plate is eaten. The leftovers are either used next day or fed to our dog and few cats. There is no special food for the pets. They eat whatever we eat.



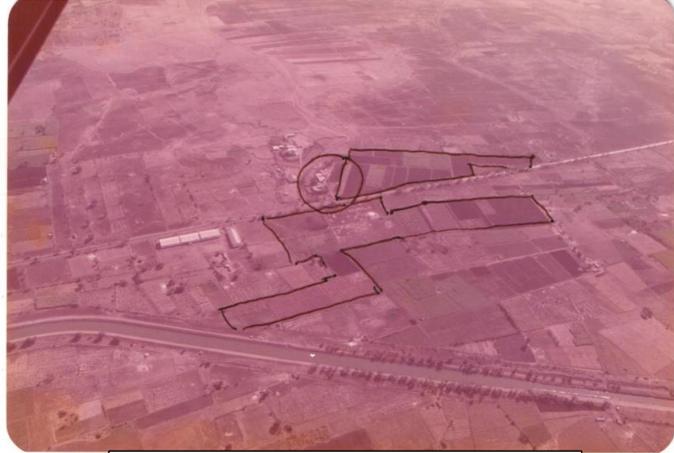
9. We have a 2-acre plot on which our house is located. It mostly contains trees planted by us. Their leaf litter rots in the soil during rainy season and provide nice mulch. The dead branches and trees provide us the wood for heating our bath water in the boiler. In fact we always have surplus of wood so that we sell it and make a tidy sum.

10. We purchased this barren land at throw away price in 1981.

The quality of land was so poor that there would be huge cracks – big enough for whole sheep to disappear in them. We planted about 30 different types of trees. With time the trees have grown so that the garden is presently like a tropical forest. Last count showed that there are about 40 different types of birds which either live in our garden or take refuge during migratory phase. The leaf litter from the trees and the

compost fertilizer has improved the soil quality and it has therefore become springy and quite fertile.

11. Similarly, when the NARI farms were purchased in late 1970s they were mostly barren. With the use of irrigation water from the Nira Right Bank canal and organic fertilizer from the compost pits the lands have become very fertile.



NARI farms in 1981.

Photo taken from a small plane.

12. Most of our groceries and vegetables are grown within 10-15 km of our home. The eggs are mostly from local poultry, milk from cows across the road and vegetables and groceries from the local market. Most of these things are grown in Phaltan area. We use safflower seed produced on our Institute farm for crushing in the local mill for oil. Thus the oil is fresh and without any chemicals. We also consume some fruits grown in our own garden.

13. Until four years ago I drove my 1985 Maruti 800cc car which transported me from point A to B comfortably. After being driven 150,000 kilometres it has been sold since it could not be insured, and neither could I get spare parts for its repair. So now I drive Maruti Alto an efficient small car which gives me between 18-20 km/litre and is small enough to go in the smallest of lanes and by-lanes of Phaltan town. For long distance driving to Pune or Mumbai (300 km from Phaltan) I use Maruti Esteem which also gives an average of 18-20 km/litre.

14. We have few clothes and they are worn until they get torn. They are then used in the house as dusters and wipers and after becoming tatters are used in the water boiler to heat the water. Mostly I wear khadi or cotton spun in cottage industries. Khadi is a very comfortable material to wear and makes excellent dusters and wipers after the shirts get torn.
15. Similarly all the papers in the office are used for writing on both sides and the used ones are brought to our house to again heat our bath water. Thus we try to recycle most of the things.
16. We have battery-powered inverters both in the offices and at home which supply enough juice during power cuts for lights, fans, and computers only. Therefore, no TV or refrigerators run on them. During electricity cuts we walk, talk, or read. This provides a good quality time to catch up on reading and discussions. Sometimes I think this is for the best as 24-hour electricity with TV and other electronic media running continuously causes distraction.
17. We do not travel very much but communicate more by phones and internet and believe that this is much more energy-efficient way of keeping in touch. With availability of broad-band internet connection both at home and in the office, it is an excellent communication and information medium. One of the positive outcomes of COVID crisis has been tremendous increase in communication via internet and has greatly helped in reducing the cost of travel and pollution.
18. We bring most of our groceries and vegetables in cotton carry bags and hence have little garbage of plastic. Nevertheless, we cannot get away from plastic as most things come already packed in it and this is the biggest nuisance we have. We have no way to recycle it. Presently we take the plastic bags and bottles to the local garbage dump from where they ultimately go to the recycling centre. The technology for recycling of plastics in rural areas is not available and is very much needed.

19. We are teetotallers and drink only water, which is boiled. Thus the plastic bottles and cans of soft drinks do not litter our garden. Drinking only water is not only healthier but also helps the environment by not producing plastic bottle litter.
20. We buy only those things which are needed and since we live simply, we do not need to buy too many things. I still use my 1985-made wristwatch which gives excellent service and also use one of our 20-year-old refrigerator. We try to get most of our gadgets repaired rather than throwing them away when they stop working. This reduces the garbage production and at the same time is easy on the pocketbook. However, India is rapidly developing into a throwaway society and hence it is becoming increasingly difficult to get the old gadgets repaired.
21. The main external inputs we use are electricity for lighting and gadgets, petrol for transport, and liquid petroleum gas (LPG) for cooking. Our per capita energy consumption (from last 2-3 years data) is 14.5 GJ/yr. for electricity (both in offices and home), 10.8 GJ/yr. in transport (mostly for petrol for 2 cars) and 2.1 GJ/yr. in cooking gas. Thus we personally consume ~ 27.4 GJ/person/year of energy. To this should be added the energy in India's infrastructure which comes to about 10 GJ/person/year. Thus our total commercial energy consumption is ~ 37.4 GJ/person/yr. Contrast this with about 306 GJ/person/year that an average U.S. citizen uses. Thus in 1/8th the energy that is used by an average America citizen we can live quite decently in a modern industrial society.
22. Our low electricity consumption results since we use only fans and LED lamps and evaporative or passive roof cooling system. Even in our offices we use evaporative roof cooling. We do have an air conditioner (AC) in our bedroom and in my office, but it is hardly used because of passive evaporative roof cooling system. Last 8-10 years data show that we have used AC for 15-20 days a year during the hot humid weather. The low

energy usage in transport is because on an average we travel between 15-17 thousand km/yr.

23. If air travel is added to the above energy, then the consumption increases drastically. With the energy norm of 1.4 MJ/passenger-km for air travel a trip to US from Mumbai consumes 28.3 GJ/person of energy while each domestic air travel consumes – 3 GJ/person [7]. Thus last year we made four domestic and one foreign trip and hence the total energy used was 86 GJ/person. This is still less than 1/3rd the energy consumed by a US citizen. Though our air travel is quite limited but still it is the biggest user of energy in our case.



24. Our average water consumption is 180 litres per person/day for household purposes. This is almost one-fourth that used by a U.S. citizen. In late 1980s we did an experiment of rainwater harvesting on a limited scale.

25. Recently however we have set up a small hut like structure in the Institute and collected the rainwater from its roof in a Sintex plastic tank. Even in Phaltan with 500 mm rainfall/year we were able to show that the area of small hut roof is sufficient to collect all the water needed for yearly drinking requirement for a family of 4-5. We now feel that our solar water purifier in combination with roof top rain harvesting system can be an economically viable answer for drinking water requirements for families in rural areas [8].

With these examples I feel a satisfying and decent life style can be maintained in much less energy and water usage as compared to that in

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western societies and do hope it may inspire the readers to do their own energy calculations for sustainable living. Interestingly if every person has the energy consumption pattern like ours then one earth is sufficient to provide all the energy needs of mankind [3].

This article was published in August 2015.



Section III: Outer space

Introduction

A powerful and peaceful mind becomes a great instrument of imagination and daydreaming. This section details the yearning of the mind which wants to increase its experiences and knowledge and leads to tremendous curiosity and desire to explore the next frontiers – death and space.

One of the inherent curiosities in humans is about what happens to us after death; do we stay here on this planet earth or go into space; what happens to our memories after death; how do we get out of the gravity field of this earth; nature of the extra-terrestrials; does the interaction of thought with gravity help in this process; etc. etc.

These speculative issues are explored in the essays in this section, and I feel their inquiry and study may help in producing a mechanism by which an individual could be connected to the Universal consciousness and help in understanding the mind of God.

50. Death, Karma and Reincarnation

Death is the most certain thing for any living entity and yet we know so little about it. It may come early or later in life but the inevitable always happens. Yet we carry out our actions and behave as if we are immortal and death does not enter into our scheme of things. However, if we understand death then we will really understand life, and this will help us to live it fruitfully and happily.

In almost every society the spiritual writings are about the art of living which prepares human beings for death. Thus, they contain intricate details of heaven and hell. Some religions also make the description of hell extremely frightening so that people will change their behavior to avoid it. Majority of spiritual writings are about how to live properly so that one can escape the cycle of birth and death. In all these writings the underlying philosophy is of the continuity of soul.

Thus, Egyptians believed that eventually resurrection will take place and so elaborate mummification ritual for treating the dead body was developed. Similar has been the case in other religions.

In Indian Yogic tradition transition of soul from body to body is like changing into new clothes. It goes through all the living species and evolves towards godhead after its karmas (Sanskrit for actions/deeds) are resolved through various births. Katha Upanishad, Patanjali Yoga Darshan and Brahma Sutra do talk briefly about the rebirth of soul in human form and how it can also be transformed into various species. Patanjali Yoga says, “The transformation of one species into another is caused by inflowing of nature. Good or bad deeds are not the direct cause of this transformation but only act as a breaker of the obstacles to natural evolution – just as a farmer breaks down the obstacles in a water course so that water flows by its own nature”. Hence the transfer of soul from one species to another seems to be an accepted thesis in Indian religion.

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A direct evidence of continuity of soul has come from people who had near death experiences (NDE). NDE seems to happen when a person is declared clinically dead but after some time returns to life. Interestingly enough nearly all the descriptions of NDE are very similar and talk of getting out of the body and going through a dark tunnel and then coming into brilliant white light. Depending upon the religion of the person he or she sees Christ, Krishna, Buddha or any chosen deity. For agnostics or atheists there is a feeling of tremendous warmth and happiness in the presence of white light.

Quite a number of people have also reported that during NDE their whole life flashes by and almost all their past actions become visible. Probably it is because the memory of their present birth is still fresh. Then somehow the self is told that his/her time to die has still not come and the person “wakes up” in the body, which is being resuscitated. Interestingly enough during this period there is no concept of time. In majority of cases tremendous change in attitude towards life and death takes place in people who experience NDE. They consider dying as a pleasurable experience and are not afraid of death anymore.

One of the most detailed treatises on death and dying is the Tibetan book of Living and Dying. Most of the material in this book is based on Indian Yogic system though Tibetan Buddhists give some terms Chinese sounding names. In this book a good description is given of what happens to the soul after death and till it gets a new body. Tibetan Buddhist Lamas call this transition state as Bardo (Tibetan word for transition).

They identify the bardos as:

1. Natural bardo of life. This extends to a person's lifetime.
2. Painful bardo of dying. This is the period, which lasts from the beginning of process of dying until the clinical death.
3. Luminous bardo of dharmatma is the period after the death experience and is manifested by varied colors, sounds and light. This is similar to NDE.

4. Karmic bardo is the time interval, which lasts till the soul gets a new body. The Buddhists believe in the Indian philosophical system that getting a new body is dependent on the karma (Sanskrit for action) of previous births. Similar beliefs exist in other religions. Hence one's actions or karma in this life seem to play a significant role in how one dies and in what form they are reborn.

Karma and Fear of Death

Karma is a Sanskrit word meaning action. However, it embraces the whole meaning of living. Thus, according to law of karma your actions or deeds (both good and bad) decide your future in this life or the next life. Law of karma occupies a central position in Indian philosophy. There are tomes written on it but here we will focus mostly on how it relates to death.

According to some commentators the law of karma is very deterministic. They claim that you are born according to your karma and things happen to you in your present birth because of your past karmas etc. Hence one cannot change the present life. This however negates the whole basis of Yoga which claims that one can change the *Sanskars* (memories) and hence one's life.

Each one of us is born with a unique genetic makeup, which provides a basic template for our general behavior. This behavior is further modified by the surroundings that one encounters in life. I therefore believe that each one of us has the power to change our destiny and our memories by our actions in this life. Our actions change the neural pathways in the brain and hence the mind which guides us to our future course of action. Thus, individually we have a free will to create our own destiny but collectively we all maybe guided towards mankind's evolution [1].

Each one of us can be thought of as an individual molecule moving "randomly" in the sea of humanity and according to the forces of opportunity acting on us. But all of us together may produce a "dissipative

structure” which is the evolution of mankind [2]. Thus, the evolution of mankind towards a greater spiritual and technological sophistication is ***quite certain and therefore deterministic.***

Also, according to Indian Yogic system, the time of death is governed by the karma of a living entity. When the karma's course is finished then death takes place. It is not clear how one can find out what constitutes karma, its duration or how many karmas a person accumulates during his/her lifetime. Patanjali Yoga Darshan simply states that *Sanyam* on his/her karma makes it possible for the Yogi to calculate the exact time of his death. This also suggests that a Yogi has no control over his death though he may know the time of exit. However, there are many instances of great Yogis who have left their body by their own will and hence can certainly select the time of their departure.

An interesting aspect of time of death was given by the great Indian mathematician S. Ramanujan who used to say that the death of a person takes place only at a certain space-time junction point. He never explained what that junction point was. Ramanujan who died in 1920 at the young age of 32 was one of the greatest mathematicians of the last century. He was basically a spiritualist and mathematics was a by-product of his spirituality. He said many times “an equation to me has no meaning unless it expresses a thought of God”. He had some powers which made him clairvoyant and hence could predict events. He even predicted that he would die before the age of 35. Quite a number of his friends and relatives used to come to him for consultation about their future and quite a number of times he urged them to move away from their present living place so that the space-time junction point could be avoided.

Though all the living entities are afraid of death, the desire to know how and when death will take place is very strong in human beings. The first impulse on sensing impending danger is to protect oneself and survival is the

cornerstone of Darwinian evolutionary theory for all living entities. The possible reasons for death fear could be:

1. The experience is very traumatic. It is accompanied by loss of identity and sometimes with tremendous physical pain.
2. The living being does not know “instinctively” what will happen to its “memory” or form. For example, whether it will find a new body, or will it be fixed in space for a long time. **So, there is a fear of unknown.** All living entities are wired in such a way that they are afraid of losing their body and with it their form and identity. If a soul can exist without a body, then we should not be afraid of death. However, the form or body, which gives us the sense of ‘I’, is very afraid of losing its identity.
3. The process of learning or moving to a higher level of consciousness is disturbed and delayed. For example, 20-30 years or even more can be lost in the process.
4. The living entity loses its ability to change “memory”. This ability comes with the brain attached to the body and with death the body ceases to exist. Thus proliferation of species in the initial stages of evolution is a direct consequence of the desire of space “G” to have and keep a body [3]. It allows the templates of memory from that species to continue.

Blocking the Pain of Death

Since the soul clings to the body, the shedding of lifetime memories at the time of death is painful. That is the reason the Indian Yogic system stresses the liberation of soul so that the painful cycle of birth and death is stopped.

Yogis also believe that reduction or elimination of pain during death would remove its fear. One of the major aims of Yoga therefore is to make the body and mind powerful enough so that pain is either reduced or removed completely.

Why there is pain and what is its purpose? Pain and pleasure are complimentary and are part of life. They are the attributes of the body. The

intense physical pain is probably an outcome of the body trying to repair itself and requires very intense brain concentration for it. All other sensory inputs or other thoughts are blocked by the pain sensation. This concentrated thought might help the brain to heal the body. This is also the mechanism where single-pointed concentration helps in memory removal. Pain therefore could be one of the key mechanisms for removing or modifying memory. Any intense experience can do the same. For example, intense pleasure of love for a chosen deity is the genesis of Bhakti Yoga (Yoga of devotion).

Interestingly, emotional, and physical pains and their intensity are similar in nature and the brain does not differentiate between the two. Recent studies have revealed that fMRI scans of the subjects showed that the pain of rejection (emotional pain) and stubbing of big toe (physical pain) illuminated the same part of the brain. We also show this similarity intuitively in our vocabulary with terms like broken heart, heartache etc. Emotional pain allows the brain to intensely focus on resolving the conflicts and at the same time helps it to send and receive thought packets.

Advanced Yogis claim to have developed a mechanism of blocking pain from reaching the brain through so called Kundalini Yoga. Kundalini is a very ancient Indian Yoga system; whose practitioners believe that there is energy (could be cerebrospinal fluid) which is coiled like a female serpent (Kundalini is the Sanskrit word for a coiled female serpent) and lies at the base of spinal cord. However, there is no physical evidence of this mechanism and process [4]. Nevertheless, yogis believe that by yogic process (mostly by imagining and willing it) it can be raised in the central canal of the spinal cord to reach its ultimate destination - the brain. They also claim that once Kundalini reaches the brain, liberation of a yogi from the cycle of birth and death takes place. Raising it is done step by step and it takes many years of practice before Yogis can raise it up to the brain. Yogis also claim that conservation of sexual energy tremendously helps in this process.

Kundalini Yoga supposedly helps to remove the sense organ inputs to the brain from various parts of the body. In medicine the pain blockers do the same. The main pain sensations from the body come through the spinal cord and probably raising of Kundalini means blocking the pain centers in the spinal cord progressively starting from the base of the spine and reaching to the top of the brain. This effectively detaches the mind from sense organs. Shri Ramakrishna used to say that as he started raising his Kundalini, his body went through the process of locking itself starting from the base of his spinal cord so that he lost control of these parts as the Kundalini traveled from the base of the spine to the head.

Yogis believe that with practice of Kundalini Yoga the mind gets completely detached from the body. This helps in developing memory or neural pathways so that at the time of death it is quite easy for the memory or soul to leave the body painlessly. Besides, they believe that with “pure soul” (without the sense organ memories attached to it) it is possible to achieve salvation from the cycle of birth and death. This is the central theme of Indian Yogic system. Patanjali says that once the *gunas* (result of karma) are resolved through Yoga then the soul becomes pure (without memory) and merges into Universal Consciousness.

Death and Memory Removal

At the time of death, it seems the ego sense ‘I’ or sense of identity has to shed the memory of attachments of sense organs. It is through the sense organs that we perceive the world and carry out our actions; hence it is these organs which give the sense of identity to a living entity. As we have seen earlier shedding of these attachments allows the removal of lifetime memories and hence is painful. Thus, almost all memories are shed except the “basic memory” which is then transferred. We do not know what that basic memory could be.

An ***analogy from modern computers will be useful in explaining this memory transfer.*** At the time of death there is a transfer of software (basic

memory) from the body. In a computer a person transfers the software onto a new machine. In transfer of soul it is done on its own. There is no agent of transfer and hence it is guided by the forces it encounters just after death. Just like software is useless without the machine similarly the soul cannot do anything without the body (hardware). Body allows the soul (memory) to change its character just like one can modify the software through a computer machine. It is only through the body that the brain receives all the sensory inputs and the body acts like an antenna for the mind. Hence the strongest desire of the soul is to get a body. This could be any body and thus the possibility of its transfer among species.

Death is the most traumatic experience for a living entity and allows all the brain neurons to fire in a laser like fashion. This very concentrated thought just before the final exit allows the memory or soul to be transferred to the higher dimensional space. This space is rigid and hence could be the realm of spirits and ghosts [5]. Thus, it is quite possible that all souls immediately after death may remain in suspended animation until they get a new body. However, one is not sure if the memory transfer takes place between all life forms or is it governed by a certain brain size. Thus, there could be a cutoff brain size below which the transformation from humans to other life forms may not take place.

The chances of ghost formation are much more in sudden death conditions. For example, people who die suddenly because of a heart attack, accidents, murders etc. may not get enough time for the sense organ detachment. Thus, the souls of such persons may retain the memory of body form for a little longer time which may result in the ghost form. We still do not know for how long the “ghost structure” can remain and what type of energy is required to maintain its stability. Those who die of natural causes get sufficient time for mind withdrawal or sense detachment of the soul and may follow the Tibetan path of three bardos.

The spirits and ghosts being in higher dimensional space might have the powers to affect life in our space [5]. Such instances of spirits and ghosts affecting life have been documented and recorded in all civilizations. Even Patanjali alludes to these beings which reside in “higher places”. However the "memory" of Yogis and enlightened souls guided by their willpower and powerful minds, could transcend the realms of spirits and ghosts and can go into even higher dimensional space [6].

Reincarnation and Passage of Memory

There are people who do not believe in life after death or reincarnation and think that after death everything finishes with the body. However, there is a strong proof from a large number of cases where there has been a total recall of past lives and events by individuals (especially children) and these cases have been reported in all societies and in almost all religions. Hence, we will take the data of these cases as experiential fact and assume that there is reincarnation and life after death.

There have been many instances when rebirths have taken place in the same or nearby households brought about by a very strong will of the loved ones. The intense love creates a powerful force for the soul to be so reborn. However, it is not known when and where the rebirth will take place. In a celebrated case the Indian saint Shri Ramakrishna described in detail how he and a very highly evolved Yogi decided to be born together on earth. He identified that Yogi as Swami Vivekananda, a great spiritual leader of India. However, it took 20 years for Shri Ramakrishna to find out about Vivekananda although he was born within 20 km of where Ramakrishna was staying! Besides Vivekananda was born 40 years after Ramakrishna and the two met each other by chance in Calcutta.

Since time immemorial human beings have been curious regarding what happens to all our actions, ideas, memories etc. after our death. There have been discussions on it in Upanishads and Mahabharata but most of them skirt the subject by stressing that one should lead a moral and upright life

so that death is welcomed as a friend rather than an enemy. We will however explore this subject in the light of what we have discussed in previous chapters. Hence it is possible that after death the following may happen to all the memories and information that a person learns during his/her lifetime:

1. Information generation is an evolutionary process. Any profound or deep knowledge produced goes in the knowledge space (KS) and it continues to increase. It is never reduced. Also, all our powerful emotions and information, whether good or bad, goes into the KS [7]. This space is filled with such knowledge from all over the Universe. Thus, the old saying that all our actions may come to haunt us may mean that the information is never lost.
2. The soul passing from one body to another carries the basic memory only. We are not sure presently what this memory is and what is its structure. However it could be the username and the password just like in the Internet where these two pieces of information allows one to access all the information from the cyberspace [8]! Once it gets into a new body and as the brain reaches full formation, then it can access the emotional information of its past births from KS. This is the genesis of reincarnation.
3. The basic memory transfer makes more sense energy-wise since it will be difficult for the transfer of soul from one body to another if large amount of memory is attached to it. Besides one of the aspects of getting a new body is that the memories of old body are removed, and the “life” starts with a clean slate. Otherwise the burden of past memories can make living quite a chore since the heavy baggage of these memories will not allow the new experiences to be gained easily. Nevertheless, the memories in KS effect a person’s actions indirectly and thus all our past actions can come to haunt us.
4. Probably these memories in KS are the *gunas* that Patanjali talks about. They can be modified or removed through Yoga. With the removal of *gunas* their effect on an individual vanishes and liberation takes place.

5. It is possible that the memory of past births maybe accessed during dreaming process [9]. During the early years of our life (between 6-10 years) our brains are fully developed but the ego sense 'I' is nascent and still developing. Thus, it is possible that during dreaming when our nascent 'I' is weak and nearly absent the memories of past life can be accessed from the KS. This is akin to prophetic dream process which has been the basis of great visions and discoveries throughout the history of mankind [10]. This ability to access our past lives however gets diminished as we grow older since the 'I' becomes stronger with addition of new experiences and memories.
6. The KS is of two types. The first that stays with earth or other livable planet. This includes the books, memories, other materials and the "atmosphere" (both spiritual and otherwise) of earth or planet. This KS moves with the earth and earthlings can dip into it to get the knowledge so that the evolution of mankind takes place. The other KS is in the Universe and as the earth passes through it, we can access it and produce quantum jumps in our knowledge. The knowledge in this KS exists because of actions of civilizations more advanced than ours.

One of the major aims of all life forms is to get a body – preferably a human one. Getting it is important in evolution of knowledge since a big human brain allows us to tune into the knowledge space (KS). Bodies belonging to other species cannot do so because of their small brain size. Hence if the soul goes into other life forms, then the overall knowledge accumulation slows down, and memories of past births cannot be changed or erased.

In order to avoid memory transfer after death into other species we need to cultivate our minds in such a manner that at the time of death we have a powerful structure of our thought so that most of the extraneous memories are shed and we create a great "Spiritual mass". Practice of yoga helps us in doing this. Creation of "Spiritual mass" is the only way to make sure that the transition of memory from one body to another human body is smooth

and that it can also go to other planets by will. Passage of soul to other planets has been discussed elsewhere [2]. It is possible that our ancient spiritual teachings about *swarglok* (heaven), etc. came because this planet was not a very comfortable or hospitable place and hence the focus was to release the soul so that it could go to other hospitable planets from where we might have originally come from.

As our technology advances, we will be able to make our future world a very hospitable place so that the body could be made strong and healthy through Yoga or designer drugs. This will help to keep the mind and brain fit so that we could leave the body at will. Thus, in future most souls may be able to produce a high “Spiritual mass” at the time of their death so that they could either stay here on earth by will or could go out of the Earth's gravitational field. Some Yogis claim that there are great masters who came from other worlds, have chosen to live in this world for its upliftment, and are hundreds of years old.

The “Spiritual mass” can be produced when the brain is working at its fullest and capable of producing deep thought in higher dimensional space. This is what great Yogis can do and is the basis of whole Yoga. As we age our brain loses its suppleness and gets petrified. Hence it cannot fire all the 100 billion neurons in a laser like fashion at the time of death. This limits most people’s capability to get a new body by will. Some of the great spiritual leaders like Christ, Adi Shankaracharya, Sant Gyaneshwar of Maharashtra, Swami Vivekananda etc. left their bodies before they reached 40 years of age and when their brainpower was at its prime. For others who cannot produce the critical “spiritual mass”, rebirth is by chance or strongly willed by their loved ones.

Basis of a Good Life

How does one lead his/her life so that it is happy, and death is painless and is welcomed more like a friend when it comes? Tomes have been written on this subject and the great masters of this world like Christ, Buddha,

Patanjali and others have spoken about it from their direct experiences. It will be therefore arrogant on my part to say anything more than what they have already said. However, we can try to understand it from the perspective of our theory on deep thought.

The whole basis of life is to have continuous happiness and joy and that is possible with a very healthy body in a very hospitable world [11]. The self can only enjoy and be happy with a body (preferably a human body) since it provides an anchor to it and allows the making and breaking of memories.

One of the keys to happiness is reduction and complete removal of greed. Greed creates tremendous conflicts and all-round unhappiness [12]. Removal of greed can be achieved by cultivating a nimble brain via *Sanyam*. A healthy body can help in creating a nimble brain. The nimble brain has a tremendous processing power and hence a small amount of data is processed very efficiently to gain useful information. This helps the mind to "get satisfied" easily and helps in satiating the desire so that the person can move on. This is the major step in greed reduction.

Sanyam also allows enough working memory space in the brain so that majority of 100 billion neurons are available to focus on a single thought. This becomes possible only when we have less memory locked up in the brain about mundane and routine worldly activities and attachments. Also, there should be an excellent conflict resolution mechanism developed internally. Deep down we should honestly evaluate our actions and should be able to live with them in peace. This act can help in freeing the mind from psychological knots, which can take up a major portion of the memory. Removal of these knots may help make the mind calm and fit for deep thought.

The final word on this subject therefore belongs to Patanjali who says, "Undisturbed calmness of mind is attained by cultivating friendliness towards the happy, compassion for the unhappy, delight in the virtuous and

indifference towards the wicked". Making this world a better and more hospitable place can also help in calmness of mind and internal happiness. This will help us fulfill both our physical and emotional needs and can help all humans to live a very full and happy life.

For most of us this planet is the only home we have. This means that besides our personal evolution we should also contribute as much as possible to mankind's evolution [13]. In this, technology will play a very major role. It allows us to take care of our physical needs and with its progress and evolution will allow us to live in a sustainable manner. Thus, to my mind the contribution of people like Edison, Ford, Einstein and Newton of this world towards mankind's evolution is at par with that of spiritual leaders like Buddha, Christ, Patanjali, etc.

Mankind has always aspired to immortality. Thus, by means of chemicals, drugs and spiritual methods humans have always strived to prolong their lives. Yogis and practitioners of healthy body cult claim that human body can theoretically live for 125 years. There are some Yogis in India who claim that some masters have lived even for 300-400 years! I believe that once our technology becomes very advanced then it will be possible for humans to have a long life. Whether that long life will be productive, happy and emotionally satisfying will depend a lot on how hospitable we make this planet earth. I believe a **combination of spirituality and technology** can provide a basis for achieving this goal [14].

This article was published in 2010.



51. Nature of Form – Why Life is Attached to it?

We all identify entities with their forms. Either living or non-living entities are all identified by their physical forms. Our own body-form creates a memory map in our brain, and we identify ourselves and others with those memories.

The idea of form has always intrigued me. If a simple physical and thermodynamical analysis is done on a system, then one faces a dilemma on how to put the energy of form in it. For example, when a body (either a living or a non-living one) gets destroyed then its atoms and molecules all get distributed in space since matter cannot be produced or destroyed except in nuclear fission or fusion; or at very high temperatures when it becomes plasma! Similarly, the energy that goes in making its structure converts into heat and is also dissipated in space. But what happens to the energy of form? And also, what happens to its space-time structure that it displaced for some time in that form?

These are some issues which I think are fundamental to species survival and procreation. ***I feel that the fear of death is associated with the destruction of form.*** Hence all living entities protect their forms and procreate to provide its continuity.

Darwin in his seminal work “Origin of Species” always talked about how all species and living organisms reproduce so that the genetic information is passed from one generation to another and survival of the fittest is tied to this concept of propagation of genetic material [1]. But the central question of why any species has this inbuilt mechanism that it wants to propagate the species or basically its form is still not answered.

Similarly, *Patanjali* in his Yoga Sutras says that the desire to have life and the fear of death is eternal but is silent on why it is so [2].

A possible answer to why it is so can be gleaned from the description of origin of Universe in *Sankhya* philosophy [3].

According to this philosophy the interaction of *Purusha* and *Prakriti* produces matter and the worlds. *Purusha* is described as omniscient, omnipresent, and indivisible entity. *Prakriti* (nature), which is always active, interacts with *Purusha* to produce the worlds.

We can think of ***Purusha as multidimensional (MD) space*** and ***Prakriti as time***. When they work together the creation and evolution of universe, and the visible world takes place.

This is similar to the conjecture of some of the modern scientists about the birth of universe. They say that in the beginning, time and multidimensional (MD) space were in equilibrium. The Universe came into being when that equilibrium was disturbed. Why that equilibrium was disturbed we do not know. Various theories abound like big bang, multiverse, brane world etc. but why the big bang took place nobody is sure [4].

I would like to conjecture on a possible scenario; after the space-time equilibrium was disturbed, time came out and the MD space started “flowing”. This flow of space possibly produced gravity and eddies which are the cause of visible matter and galaxies. Eddies are small whirlpools which are formed when anything flows turbulently [5]. These are clearly seen in the flow of water in rivers and canals. In air they give rise to production of drag on airplanes which sometimes produces bumpy rides.

Formation of eddies is like a new structure being formed from the chaotic (turbulently) flowing material. According to chaos theory order and form suddenly materialize out of chaos [6]. These structures in chaos theory are called “attractors” and probably gave rise to the matter and form of the visible world. This is what scientists call as production of matter from vacuum [7].

Thus, the visible world seems like a crystallization of the higher dimensional space and is the basis of all forms.

Eddy formation is a continuous process, and it is possible that with time more and more space is used up for these structures to form the visible world. The rest of the space remains invisible and could be the basis of dark matter and dark energy that the physicists and astrophysics talk about [8].

Thus, it is possible that the production of eddies and hence galaxies and visible worlds will keep on happening till all the dark space is used up and then the reverse cycle of converting visible world to invisible MD space will commence [9]. This will finally lead to time and space coming back in equilibrium. This is the eternal *Brahmakala* cycle; at the end of which all the life in the Universe is supposed to be destroyed [10].

According to *Sankhya* this “exhaustion” of space takes place since *Purusha* has “experienced” and has become satisfied though one is not sure what *Sankhya* means by experienced. Same thing is said by *Patanjali* in his *Yoga Sutras*.

Why does the MD space go through the journey starting with inanimate celestial bodies, then to the humblest of living systems and proceeds to evolve into a highly thinking human brain and even beyond? ***It is because movement and “becoming” is the only way in which consciousness can exist.*** A system in which nothing is happening is a dead system. The MD space can only “feel” and “enjoy” itself through living systems and thus wants to maximize the number of living bodies. Also a big and powerful brain has the capability of producing mind-matter interaction which can change and manipulate the space-time continuum [11].

Just like the rainwater starts its journey with many small tributaries and goes through rivers and ultimately to an ocean, the MD space may go through innumerable life forms and may evolve through humans and other

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more evolved beings. This follows the laws of thermodynamics in which the system tries to maximize the flow of energy and materials through it with minimum of resistance. The MD space minimizes this resistance by going through billions of life forms. These ***life forms fill up the MD space*** and evolve till they obtain the power to change space-time fabric so that the closure of space takes place, and the cycle continues.

This force to fill up the MD space rapidly is possibly the reason why the living beings want to continuously replicate their forms and fear of death is losing that form.

This article was published in November 2020



52. What Happens to our Memories after Death?

The brilliant imagery used by Shri. Ramakrishna to describe the birth of Vivekananda and his origins was a very mesmerizing account that I read when I was young. In that account Ramakrishna describes how a small portion of the memory of a Rishi came down to earth and was born as Vivekananda [1]. I was always intrigued about the nature of that memory and especially about how it came from the outer space to earth.

I have written before about how our memories go into knowledge space (KS) and influence our actions on this earth [2]. It seemed the description of Ramakrishna about his and Vivekananda's birth tallied with that though we are still not sure about the nature of knowledge space and where it is located.

So, what happens to our memories after death? Throughout the history of mankind every civilization and thinkers in those civilizations have grappled with this subject. All life forms are afraid of death. We not only want to preserve our forms but also our memories and experiences [3].

So, if they are lost after our death, as most people believe, then I feel it is such a waste of effort to live and experience life. Thus, there has to be a better answer than that. The whole basis of Darwinian evolution is transfer of information from generation to generation and memories are a very important part of that [4].

In quite a number of societies, resurrection, reincarnation, rebirth etc. are frequently mentioned but very little information is available on what happens to lifetime memories and what is reborn. Similarly in all our ancient Indian scriptures (Mahabharat, Bhagwat Gita, Upanishads, Brahma Sutra, etc. [5,6]) death is frequently described and discussed; with reincarnation as an accepted fact, but what is passed and how much, has always remained a mystery.

Buddhists very strongly believe in reincarnation but do not say what passes through after death and also what happens to memories [7]. The discussion in all these scriptures generally skirts the subject, with emphasis given on living a good life so that better rebirth can take place. It seems in the absence of knowledge this is a cop out!

One of the pioneering works on reincarnation was done in the 1970s by Dr. Ian Stevenson, a U.S. researcher [8]. He interviewed almost 3000 children worldwide regarding reincarnation. Most of them had experienced traumatic and violent death and the recall was only of how they met their untimely end. Interestingly they recalled very little about the previous birth and with age (by 7-8 years) even that memory waned.

That is the nature of life and probably a good thing since most of the mundane memories are not transferred, otherwise each life would be burdened with all the baggage of previous lives weighing down on it. Every new life should start with as clean a slate as possible. Somehow the traumatic death allowed the information from the previous life to pass to the next one.

A possible mechanism of this memory transfer could be that a username and password might pass through death and this helps access the memories in KS [9]. When the death is violent and hence very traumatic, somehow this username and ID gets triggered. For most of us even if we do not remember our previous birth events there has always been a sense of déjà vu, sometimes in our life, about places, events, or people. I feel that is because of our past memories.

Since all our strong memories which include emotional and other memories, go into knowledge space each person or life have their unique KS [2, 10]. These memories are a product of deep thought on a single subject and are earth bound and are part of the abode of spirits, ghosts, and other entities [11].

Then there are memories, which are the result of even deeper thought and achieved via *Dharmamegha Samadhi*, have the ability to form a soliton which is very stable and can interact with gravitational field and hence can go into deep space [12,13,14]. The formation of such a soliton probably leads to *Mahasamadhi* – leaving of body by will as was done by Vivekananda [15, 16].

Most of the experiences, knowledge etc. that a person accumulates in his/her lifetime is partially transferred genetically (through children); transferred through writings, speeches, interaction with others - physically or through the internet; or through deep thought in KS [17]. Thus, the sum and substance of life is not lost but goes in helping the evolution of mankind. ***So even after death this aspect of knowledge remains.***

I also strongly believe that one of the major aims of human life is intergalactic travel [18]. In the present technological era, it is nearly impossible to do so. If we get the UFO technology, then it might be possible [19]. We are not sure when that will happen.

Thus, in the present scenario the best way to travel intergalactically is via the soul route after death [20]. In Indian scriptures this is called reaching the abode of Gods - probably the place described by Ramakrishna in his vision of Vivekananda's birth.

One of the ways by which a memory remains attached to the earth's gravitational field is via remembrance. If a large number of people think about a great soul, then his/her chance of leaving the earth becomes less. Maybe that is the reason why the gods, deities and great souls who may have come from other planets have remained on earth. So, to leave the earth's gravity a possible way is not to become known and very famous.

Since our most significant memories remain after death and go in KS, we should all live a full, purposeful, and happy life – a life doing good deeds and karma. And whatever knowledge we have gained should be shared freely with others. This collective knowledge together with our memories will help in the evolution of mankind.

This article was published in August 2021



53. Revenge of Karma

Karma is defined as an ecosystem in Indian philosophical thought. All actions one does or has done in the past have consequences for the present and the future and is loosely called as Karma.

Most of the treatises on it are silent on what exactly Karma is, how it affects our actions and what its nature is. We will try to explore it in the light of modern scientific and technological advancements.

In modern computing most of the memory and information is stored in a cloud. This cloud is stored in servers - a physical entity, which are scattered all over the globe and store the information of individuals and organizations.

This information can be obtained by the use of appropriate login ID and password. The advantage of cloud is that it prevents the individual computers, tablets and phones getting cluttered up with extra storage memory and thus most of their memory can be used for processing data rather than storing information. Also, in the event of these machines getting destroyed or lost the information always remains in the cloud which can be later obtained via new machines.

Similarly, it can be conjectured that all the deep emotional memories of each individual go into a spiritual cloud called Knowledge Space (KS) [1]. KS can be defined as space which is filled with memories of very deep and intense thought and emotions and fundamental knowledge and discoveries. Similarly, intense negative thoughts and emotions like lust, hatred, jealousy, pain, etc., which are also a product of intense concentration for a reasonably long time, may reside in KS. Thus, KS is a depository of both positive and negative emotional memories. The mundane and shallow thoughts are not stored in KS since the energy used in producing such memories is not strong enough to send them to KS.

Since the life forms are also a part of intense memories, KS may have templates of past life forms which manifest sometimes as ghosts [2]!

As we keep on adding information to our cloud our profile keeps on building. This profile affects and influences our interaction in the cyber world. Similarly, our memories in KS affect our present and future behavior. If we remove the cloud completely, we can start a fresh with new identity and information. In the same way removal of memories from KS allows us to get away from the cycle of birth and death. This is what Patanjali talks about in his *Yoga Darshan* when he says that resolution of *gunas* or memories (their removal) removes their effect, and the role of *Karma* vanishes [3].

Just like the memories in cloud tell about the personality of a person and remain till they are erased so in the same way the memories in KS remain and can come to haunt us till they are removed. The memories in KS therefore drive the cycle of birth, death, and reincarnation. This is the revenge of *Karma*.

So how do we remove the memories or *gunas* from KS so that one can be liberated from the birth and death cycle? The first step is the removal of memories from the brain, since it is the driving force for their transfer to KS. This can be done by deep thought or *Sanyam*. Focusing on a single thought for a long time is *Sanyam* [4]. Practiced daily and for many years this has the ability to form new neural pathways. These new pathways remove the old memories since the energy required to produce a single thought needs high amount of processing memory which can only be made available by dissolving the existing memories.

Removal of an individual's memories from KS is very difficult since these are stable memories and have been formed since ages. However, when the brain becomes very powerful through *Sanyam* then it also gets the ability to access these memories from KS. This is the genesis of great discoveries [5].

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This naturally gives the brain an ability to modify and remove the memories. This could also be the reason why advanced *Yogis* are able to know their past karmas and hence their past birth. Patanjali alludes to this in his *Yoga Darshan* when he says, “By making *Sanyam* on previous thought waves and subliminal impressions a *yogi* obtains knowledge of his previous lives”.

Hence by removing extraneous memories both from our brain and KS through *Sanyam* we can dissolve our *Karma* and merge into Universal Consciousness.

This article was published in November 2017.



54. Web of Love

There is a story that Narad Muni was once sent to the earth from heaven by Lord Indra to fetch water [1,2]. This was also to teach Narad the lesson in powers of Maya [3]. Narad on coming to earth met and fell in love with a maiden and lived with her and their children for 12 years, before he had a revelation regarding his true identity. He went back to Indra who told him that he was gone only for $\frac{1}{2}$ an hour of heaven time. That was Indra's theory of relativity!

Similarly Adi Shankaracharya was once engaged in a debate by a Mishra couple who challenged him that being an ascetic monk he does not know anything about love and householder life and concerns [4,5]. He was stung by the criticism and decided to learn about it. He left his body by yogic powers and entered the body of a recently dead king and enjoyed the company of his beautiful queens for many years and would have continued to do so before his friends brought him back to his "senses" and his original body. He understood the power of Maya firsthand!

In every religion getting into *Mayajal* or web of love is frowned upon. They all insist that renunciation, breaking of bonds etc., frees the soul from the cycle of birth and death so that ultimate salvation and liberation takes place. But liberation from what?

All religions insist that we should liberate ourselves from the human bonds so that we can become free and merge into Universal Consciousness [6]. Some religions even preach that after death one reaches heaven where all the goodies are available round the clock forever! But isn't this earth of ours that we call home with all its happiness and pain a part of Universal Consciousness?

What is the basis of such teachings in almost all religions? First of all most of these religious teachings are of very ancient origin and were produced at

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the time when the humans lived in stone ages with hardly any technological achievements. Hence some felt that it was better to give humans the opium of better after-life so that they could be used as slaves for few masters without grudging or questioning. This could be one of the explanations.

The other explanation could be that as life was evolving on this planet earth there were visitations in spaceships by human-like forms from advanced civilizations of different planets and worlds [7]. These could also be Gods of ancient times. These aliens came to colonize this virgin planet.

As they settled, they multiplied among themselves and may have even mated with the evolving humans on this planet. The purity of race might have become an important factor at that time and may have been the basis for racism in humans. The Indian caste system could also have been the result of this desire to keep the purity of race and hence the notion that we are one of the oldest civilizations of this planet earth maybe true.

Though the aliens stayed on earth, but the planet of origin or home must have been heaven and primitive life on earth as hell. This could have been the genesis of heaven in after life. Since they came from a very advanced civilization it is quite possible that they must have made the conditions of life on their planet very sustainable and pleasant.

I believe that as we expand our technological frontiers, we will also make this earth a very hospitable and sustainable place to live in and then will colonize or visit other planets. We then might call earth a heaven in comparison to some other planet that we might visit, where the life maybe in primitive state of development.

It is therefore important for all of us to contribute according to our capacity to make this planet a hospitable place. Thus our personal evolution and our contributions to the society should progress simultaneously.

This desire of the aliens to go back to the parent planet might also have been the origin of practice of preserving the dead bodies. Thus mummification in Egypt and burial of dead in other cultures was the mechanism to preserve the bodies till the arrival of spaceship from the parent planet so that the bodies could be resurrected and taken to it [8].

The memories of that planet must have been strong in the genetic code of early humans. However as the time passed this became a ritual handed down from one generation to the other [9]. I feel in future as our genetic material undergoes transformation we will slowly forget these customs and rituals and evolve new ones which are based upon the realities of this world.

Energy wise it becomes very difficult to get out of the gravity of this earth. Ancient Indian Yogis have claimed that by willing one's own death, one can use the gravity of sun and moon to help the transmigration of soul to other worlds. For example Bhishma Pitamah in Mahabharata stayed on the prickly arrow cot for about six months before he left his body by will at winter solstice [10]. Similarly Swami Vivekanand studied the almanac thoroughly before deciding when to leave his body. They obviously understood the effect of gravity on human thought and memory (soul) [11].

This process of soul guidance by gravity field is an efficient way for knowledge seeding of this world and may explain the birth of great masters like Buddha, Christ, Ramakrishna, etc. Probably these souls came from advanced civilizations. For these superior beings the knowledge of planetary movement must have been important and could have led to the importance and development of astrology. Later on it degenerated to seeing the effects of planets on an individual's life and does not have any scientific basis.

Leaving the earth's gravity field after death can be done by very few enlightened souls. Most humans become residents of this planet earth both in bodily and ethereal forms [12]. Probably in ancient times humans could get out of the gravitational field of earth through the practice of Yoga

because of the superior genetic make-up of the aliens from advanced civilizations.

However as our genetic material got mixed with evolutionary life forms of this planet, we might have lost the ability to achieve those commanding heights. Shri. Ramakrishna used to say that the Yoga of Kaliyuga is Bhakti because other Yogas like Raja Yoga etc. are difficult to practice and may require superhuman efforts. For ordinary people Bhakti Yoga is an easy way out. Maybe he understood intuitively the process of evolving humans.

However as our technological achievements advance, we will be able to develop spaceships which may overcome gravitational fields of the planet earth much more efficiently than those of today [13]. Then we will be able to travel intergalactically to other habitable planets with our bodies. This is how the ancient gods in their spaceships might have visited this planet. All technologically advanced civilizations probably are similar.

As the numbers of humans have increased on this planet earth, the web of love and human bond has become stronger. This is the basis of the concept of Knowledge Space (KS) [14]. We should realize that this planet earth is our permanent home and is all that we have, and this is both heaven and hell. We are all part of the web of love and KS of this planet, and there is nowhere else to go.

If we take this view, then we will change our thinking so that we do everything in our power to make this planet a very pleasant place to live. We will then stop over exploiting it, killing our fellow humans, plundering the resources and help make it possible to achieve technological advancements for intergalactic space travel. We should therefore try to create a sustainable and happy world for all our future generations because most of us will be born again and again on this planet.

This article was published in March 2003.



55. Flying as a Spiritual Experience

On 17 December 1903, Wright brothers in U.S. became the first human beings in recorded history to have a sustained flight in a manmade machine [1]. Similarly in 1903 a Russian schoolteacher Konstantin Tsiolkovsky had suggested for the first time the use of rockets for space flight [2]. However it was only in 1926 that Robert Goddard in US fired the first liquid fuel rocket that set the man on the path of space exploration [3]. In the last 100 years our technological developments have been rapid and thus we have been able to send the man to the moon, been able to jet across our planet earth and there are indications that one of the space probes Voyager, launched 26 years ago, has reached the edge of our solar system some 13 billion kilometers away [4]. From this distance the radio signal takes more than 1 hour to reach the earth.

Since time immemorial man has dreamt of flying and reaching the stars. In all mythologies gods are shown to have powers to go to any place at will. In Patanjali Yoga Darshan it is stated that a yogi can get, through spiritual practice, the powers to fly through space with speeds matching that of mind [5]. Mahabharata and Ramayana have references to flying machines and in other societies also gods have always been portrayed as shining beings coming to earth from space. Almost all our scriptures talk about liberation from this planet earth and urge us to go to higher worlds or swarglok [6].

Hallmark of evolution is motion and increasing speed of motion. As we progress in our technological developments, we will produce spacecrafts which will allow us to fly efficiently both on this planet earth and intergalactically at very high speeds. Our brains are somehow wired in such a way that we feel exhilarated in overcoming the gravitational field of earth.

Thus people with an out of body experience (OBE) have reported spiritual experiences of flying at will and getting away from the gravitational pull of earth [7]. Similar experiences have been reported by people who practice

hand gliding [8]. They talk about the thrill of flying silently almost like a bird. Our future technological developments in space travel may therefore allow us to experience this thrill while still possessing our bodies.

Almost all the astronauts who have flown over the earth talk about the beauty of blue earth in spiritual terms. Similarly moon landing itself was a spiritual experience to some astronauts [9]. The dark background of the sky with sun shining on the moon surface was described by many astronauts as incredibly beautiful. Similarly flying over snow-covered mountains, green fields and forests is very pleasing to the eye and shows the beauty of mother earth from close quarters.

Human beings have always reacted with awe and goose pimples when observing the powerful forces unleashed either by man or by nature. Thus Robert Oppenheimer the father of atom bomb described in almost spiritual tones the explosion of the first bomb in Trinity in New Mexico, U.S. [10]. Similarly when astronomers peer through their telescopes and instruments and see and study the gigantic forces, which are billions of times greater than atomic bombs, shaping our universe they are filled with awe and talk of seeing the handiwork of God. In Gita when Lord Krishna showed Arjun his "Virat" form it is possible he was showing him the galaxy formation and black hole [11]. This awe-inspiring event made the hair on Arjun's body stand up. As we advance technologically, I am sure we will travel in our amazing spaceships visiting different planets and observing firsthand these great forces at work.

Thinking about stars and seeing the forces of Universe may also give us a certain perspective in life. We are like a small speck of dust in the vast Universe and yet our petty worldly matters overwhelm us. The best way for all of us to be exposed to wonders of stars and cosmos is to learn about them in schools. Hence astronomy should be encouraged in all school curricula.

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It is quite possible that in future we will explore space not as much for finding another home for mankind but as a spiritual experience. Then we will thank Wright brothers and Goddard for making it possible for us to fly and travel in space.

This article was published in November 2003.



56. Free Will, Evolution and Chaos Theory

Most people's belief falls into one of two categories. Some believe in fate and say that everything is ordained by God, and we can hardly change anything. There are others who talk of free will i.e., whatever we are is because of our actions or Karma. I think the reality is somewhere between these two beliefs.

Shri. Ramakrishna the great saint of Bengal used to give a very insightful answer to the question of fate [1]. He gave an example of a cow tethered to a pole with a long rope attached to her neck. He said that the cow feels she is free to roam anywhere but the perimeter of the area in which she can move is fixed. Shri. Ramakrishna said that similarly every human being has a free will, but the length of rope is governed by God. This example has a great parallel in the modern science of chaos theory.

Chaos theory shows how life evolves from a seemingly chaotic situation [2]. A classic example is the development of convection currents in water when it is heated in a utensil. Heat provides energy to each water molecule, which darts around at random and in chaotic fashion all over inside the utensil. However, after a certain time a band of convection currents develop in which the heated water molecules rise up and are replaced by cold water molecules [3]. This band is like a tube or a structure through which the water flows. Thus, the seemingly chaotic behaviour of water molecules is converted into an orderly structure. If the heat is removed, this structure collapses.

In the same way life, which is an ordered structure evolves from seemingly chaotic molecules inhabiting our planet earth.

This analogy can also be applied to humankind where each one of us lead our own separate lives which "darts" randomly depending on the forces acting upon us and yet collectively we go forward in a band which is called

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human evolution. Thus, we have our free will, but are tethered to this band of evolution similar to the cow in Shri. Ramakrishna's example.

Does this mean that whatever we do is meaningless since we will always have to act within this band of evolution which will occur regardless? The answer is no and again the example of water convection will help.

The convection currents are dependent on both the quantity of heat and the speed at which it is transferred to the water. The convection currents do eventually form in heated water but are speeded up by the amount and velocity of heat transfer.

Thus, the evolution of mankind will also take place anyway. However, by our proper actions we can speed it up. That is the advantage and value of free will.

What is human evolution? I think the goal of all human beings should be to live a long, healthy, and emotionally fulfilling life. This type of life can be achieved if we make his planet a very sustainable place to live in. We can do his by our free will and by all of us working towards the goal of planet development.

This earth is the only world we know and have. This is our hell and heaven. Unless we master the technology to leave this planet's gravitational field on a large scale, this will be the home for majority of people for many generations to come. Thus, the sooner we make it a very hospitable place which is sustainable, environmentally pleasing and where everybody is happy and lives a meaningful life the better it will be for us and the future generations. Our free will can speed up this process.

The life and evolution on the planet earth (just like convection currents in water) is governed by energy. All our energies either in past, present or future have and will come from the sun. All the biota, fossil fuels etc. are

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solarly derived. Our fossil fuels are solar energy embedded millions of years ago whereas our green trees and plants are present solar energy. Hence our evolution is governed by the amount and intensity of sun's energy. We get about 16,000 times more energy from the sun than what the mankind presently uses. This energy therefore sets the limit on our evolution.

The ultimate evolution of mankind will therefore be based on using solar energy directly just as life has done through millions of years and to run our industrial lifestyle on it. Thus, the faster we get on the direct solar economy, the faster will be our evolution.

This article was published in July 2007.



57. How Earth's Gravimagnetic Field Affects Human Mind

There is an interesting story in Ramayana about Shравan Kumar who carried his aged and blind parents in two baskets hanging on his shoulders, taking them to various holy places in India for pilgrimage [1]. This story is always told by parents and elders to young children as an example of how a son should be devoted to his aged parents and take care of them.

The story also says that when Shравan Kumar reached somewhere near the vicinity of Meerut or Hastinapur, suddenly negative thoughts came to his mind regarding his parents; for example, why he was wasting his life ferrying his aged parents; he should abandon them since they are aged anyway, etc. etc. Only when he left the area then these thoughts vanished.

Changes in Earth's gravitational and magnetic (Gravimagnetic) field affect the mind. Brain produces low level electromagnetic (EM) field as a part of its thinking process [2]. Our present age is an electric age and thus we cannot help being engulfed in EM fields. Whether they are from our cell phones, or overhead high voltage wires, or microwave ovens, or MRI scans, etc., we are continuously bombarded by them and cannot escape them. These man-made fields together with the fluctuations in earth's magnetic fields created by solar storms provide a very large number of possibilities of affecting the human thought process. The exact mechanism of how this happens is not presently understood.

Nevertheless scientists have used magnetic fields (both static and dynamic) for treating brain disorders [3]. Thus depression, some forms of fits and headaches have been treated by applying small amount of static and dynamic magnetic fields on human skull. Some have even suggested that such cranial treatments give them better sleep and reduction in anxiety.

It has also been discovered that the functioning of the brain of astronauts who stay for long time in microgravity environment of outer space is

adversely affected [4]. Tests done on them after they return to earth show reduction in their response time and sharpness of mind. How the microgravity affects the functioning of the brain is still not understood.

Nevertheless, there is enough data to show that changes in geomagnetism and gravitational fields affects the brain and hence thought.

Some speculation on how gravity affects thought can be seen in the interaction of alpha waves with earth [5]. Alpha waves are produced in the brain when we are in meditation or relaxing mode [6]. These waves are generally in the range of 8-12 Hz frequency. The earth's diameter (~ 12,800 km) is such that it can have a standing half-wave of 11.7 Hz (very close to 12 Hz). Is it therefore possible that our brain evolved in such a manner that the ***earth's geometry (and hence its gravity) influenced the alpha wave production?***

Incidentally scientists have also discovered that before major earthquakes an electromagnetic wave of 0.01-10 Hz comes from deep inside the earth. This wave is sometimes sensed by animals and could be the basis of reported earthquake prediction by them. In some other habitable planet, the living beings may have different alpha waves depending on the geometric shape and size of that planet. ***Similarly, life on other planets may evolve according to their gravity fields*** besides the effect of other environmental variables.

The relationship between alpha waves and earth's gravity may have other implications. Practitioners of *Bhakti Yoga* (devotional yoga) and Buddhist traditions have always stressed the need to allow full flow of thought waves without any interference from ego or sense of identity 'I' for achieving Samadhi. *Bhakti Yoga* and Buddhist tradition says that one should completely sublimate the ego 'I' by abandoning oneself to God or Universal Consciousness. I feel both these practitioners are intuitively trying to allow

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the mind to get tuned to the gravitational field of the earth resulting in meditation and *Samadhi*.

Also, both gravitational and magnetic fields of the earth, world over, vary slightly from their mean values. Since they can affect the working of the brain, it is possible that some places may be more conducive to creating deep thought and creativity. In ancient times this could have been one of the bases of site selection for setting up temples and holy places around the world.

There is a strong scientific evidence that the earth's magnetic poles will flip over [7]. That is the magnetic North will become South and vice versa. When that will happen is anybody's guess but it is long overdue. Flipping of poles will allow increased bombardment of earth by solar wind and cosmic radiation since the protective shield provided by earth's magnetic field will weaken. This may affect the communication and weather. But more than that I feel it may affect human thought in a substantial manner. In what way is open to question!

This article was published in April 2018.



58. Can Mind interact with Matter – A Conjecture

Throughout the history of human civilization there have been large number of instances where so called “miracles” have been performed. These have included levitation, production of material things from thin air, physical healing, etc. The nature of these miracles is same, irrespective of religion and different civilizations. Some of their accounts have been exaggerated but a large body of information shows remarkable consistency in their nature and reporting though the producers of such miracles always claimed that God or higher forces and entities use them as medium [1].

To my mind these events have come because of interaction of human thought and material surroundings. After all, a thought produced by physical brain must be physical in nature and hence governed by certain scientific laws. Thus, the curiosity arose about which laws of science operate to make these things happen. This essay is my humble attempt in trying to understand them.

I have been exploring and writing about these issues since 1977 though the desire to understand them started from my childhood [2]. They were initially written in a diary form and then distilled in my first book, “Nature of Human Thought” which was published in 2004 and its second edition in 2010 [3]. Recently I have written another book Exploring the Mind of God” which extends and explores mind-matter interaction issues further [4].

Most of ideas written in this diary are however intuitive in nature and hence not exact in the formal sense. So about 5 years ago I posted the complete diary on the web for wider circulation in the fond hope that some bright reader might be inspired by the ideas and help in providing a rigorous and scientific proof to some of them [2].

Since 2002 I have also been writing on these issues quite regularly in Times of India (Speaking Tree section); Huffington Post and recently in Thrive

Global. All these essays are also available in my writings [5]. However, they were scattered all over the place, so I felt it appropriate to put the salient features of mind-matter interaction in this essay.

Most of the times scientists scoff at these conjectural ideas and term them pseudo-science. However if in early 1800s somebody had told mankind about Einstein's relativity theory and the space-time continuum, people would have had the same reaction as today's so called hard-core scientists have about mind/matter subjects [6]. ***The black magic of today is often the science of tomorrow!***

The spirit of science encourages our imagination to flower and to conjecture and the only validity of such conjectures is the proof from the experiments. It is my firm belief that we should have an open mind about mind/matter interaction and try to figure out how it could be possible. When large numbers of people throughout the history of mankind have reported strange phenomena, they were not fools but were simply reporting events about which they did not understand. We owe this much to ourselves to at least try to understand these phenomena, try to explain them with the present laws of science and in the process even extend the laws of science. Science makes progress only when it helps develop theories which explain the existing experiential facts. To deny the existence of these facts in the mind/matter realm is to rob the science of its jewels and to retard its progress.

A great joy results when we look deeply at anything. It is the nature of human mind that when it is working at its full capacity on something positive then great contentment and happiness results [7]. I feel understanding mind-matter interaction process falls in this category.

Mind matter interaction can only happen when human thought and gravity can be correlated. Matter and gravity are interlinked and as the famous theoretical physicists John Wheeler had stated "Matter tells space-time how

to curve and space-time tells matter how to move [8]”. According to Albert Einstein gravity is nothing else but a curvature of space-time continuum and hence geometric in nature.

It is my conjecture that the structure of thought is also geometric and hence it is possible that both gravity and thought are related at a deeper level.

We will try to explore this relationship later. But first we will try to understand the structure of thought and explore the possible mechanism on how it could be related to gravity.

Thought structure

There is a consensus that a thought is produced when the brain neurons fire. How many neurons fire for a single thought nobody knows? We can further conjecture that firing of neurons produces a ***hologram structure*** which can be called a thought.

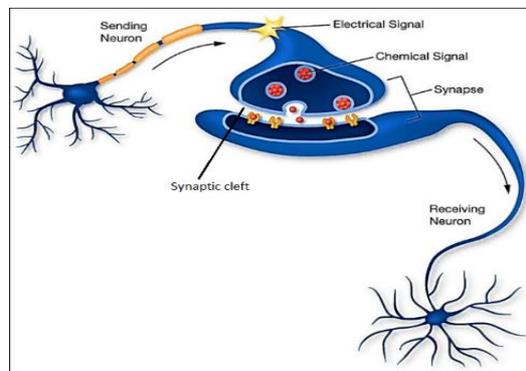


Fig. 1. Neuron Communication

Firing of neurons takes place when neural pathways are activated [9]. This activation is triggered either by signals from our five sense organs or stimulation of certain memory space in the brain. Neural pathways help neurons to communicate with each other. During this communication electrical signal from a neuron is converted into chemicals (neurotransmitters) and transmitted across the synaptic cleft to another

neuron where it is again converted to electrical signal for onward journey [10]. Synaptic cleft is an extremely small space (~ 20 nm) between two neurons as shown in Fig. 1.

The process of conversion of electrical signal to chemicals and then again to electrical signal produces weak photons - possibly in synaptic cleft [11].

It can be conjectured that these photons from large number of neural pathways combine to form a hologram which we can call a thought.

As this thought-hologram is three dimensional it could be the reason why most of our thinking is geometric in nature and we seem to visualize everything in terms of shapes and geometry.

How does such a firing of neurons produce a thought? Emerging science of synchronization might help to explain it. This field emerged when it became possible to explain successfully how a very large number of fireflies after their random initial firing, started glowing in a synchronous manner in a short time [12]. Thus, synchronization of fireflies glowing, heart cells beating (pacemaker), etc. are all outcome of a spontaneous order by which a large number of similar objects or oscillators start working or firing in unison [13].

These oscillators synchronize spontaneously since they are influenced by each other via a positive feedback-type mechanism. For example, in case of fireflies this feedback is through their light signals whereas in heart cells it is through mechanical coupling. The feedback allows the oscillators to adjust their phases so that they synchronize to produce the desired intended result. ***In a similar way it is possible that the weak photons produced during firing of neurons synchronize and form a thought-hologram.***

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Each thought is a result of activation of a unique set of neural pathways though we still do not know how many neural pathways are needed for it. Just to give a sense of complexity of brain let us look at the numbers of possible neural pathways in the brain.

There are close to 100 billion neurons in the brain (the exact number is unknown). Each neuron has many dendrites and axons which connects it to other neurons. Recent scientific evidence also suggests that besides neurons another type of cells called glial cells take part in communication [14]. Glial cells outnumber neurons by nine to one and can modify the signals transmitted by each neuron. Thus, the number of different combinations for neural pathways and thought production are mind-boggling. That is the reason why human mind can generate millions and zillions of thoughts!

However, the photons for each thought signal has to be synchronized to produce a stable structure. This synchronization is guided by an entity called 'I' (ego, will, sense of identity, etc.) which acts like a symphony director and helps provide the necessary energy and focus to maintain a given thought for a certain time [15]. It also synchronizes random signals emanating from different parts of the brain to form a stable thought-hologram and constantly compares it with signals from outside to provide us a sense of reality.

We still do not understand completely how 'I' can influence this process, but just like the music conductor who determines which part of the orchestra plays for how long, 'I' decides how long a particular thought will remain in the "vision" field [16]. This process is called concentration and seems to also exist in animals.

With practice, concentration becomes stronger till a person can make nearly all the 100 billion neurons fire in a laser-like fashion for a long time on a single thought. This is the genesis of meditation or *Samadhi* and results in

Sanyam according to Sage Patanjali [17,18]. According to him *Sanyam* on any subject results in its complete knowledge.

The production of weak photons for thought formation could also be the reason why many Yogis have experienced seeing white light during intense meditation [19]. Similarly the observation of white light by persons during near death experience (NDE) could be an outcome of nearly all the brain neurons firing during the final exit.

I also conjecture that with practice the deep thought-hologram can be made so intense that it can ***transform suddenly from 4-dimensional space-time to higher dimensions and may reside there as a very stable memory and possibly interact with gravity.*** We will explore this idea further.

Thought in Higher Dimensions

Our world that we see, and feel is four-dimensional (three dimensions of space and one of time). However, theoretical physicists have recently suggested that there could be 10 dimensions of space and one of time to make our universe 11-dimensional [20]. Cosmologists and physicists invoke these extra seven dimensions in order to relate electromagnetic, nuclear and other forces with the all-pervasive gravity field. Unfortunately we cannot see these higher dimensions but at best can conceptualize them through higher mathematics. Even Einstein in late 1930s dabbled in higher dimensions to create a unified theory of everything but gave it up later on [21].

Interestingly our present universe has only 5% ordinary visible matter and the rest 95 % consists of "dark matter" and "dark energy" which we cannot see and know very little about [22]. It is quite possible that this energy and matter may exist in higher dimensional space [23].

An interesting aspect of higher dimensional reality could be that a being residing in it will be able to predict events in our four-dimensional world

since he/she will have a “better view”. Some yogis get this power through *Sanyam*.

According to *Sankhya* and *Patanjali* yoga systems Universal Consciousness is even more ancient and pervasive than gravity and it is quite possible that our universe may be multi-dimensional and substantial part of it exists in higher dimensions. It is also possible that the four-dimensional space-time continuum, which we can visualize and feel, could be a “crystallization” or “shadow” of multi-dimensional reality.

Our ancient Rishis and Yogis seemed to have some knowledge of this cosmic process. For example there are few sutras in Patanjali Yoga which describes about space and time on similar lines as the present theories [24]. Similarly in Bhagwat Gita Lord Krishna showed Arjun the “Virat” form (Virat means huge) or the birth of cosmos [25]. The description of “Virat” form in Chapter 11 of Gita is very similar to that of destruction of matter by a black hole! For Arjun to see this form Lord Krishna gave him a divine vision since with the existing vision it was not possible to show him the multi-dimensional reality. Maybe for us also it might not be possible to see the higher dimensions till we remain in the present four-dimensional world.

The four-dimensional space-time continuum is slightly flexible and thus it can be bent by massive bodies. The bending of this continuum results in deflection of light when it passes near these bodies. Einstein predicted this bending of light in his famous paper on General Theory of Relativity published in 1915 [26]. This prediction was confirmed experimentally in 1919 by the British physicist Arthur Eddington when he showed that the light from a distant star bent as it passed the sun during the total solar eclipse.

We can conjecture that as the space-time dimensions increase and become greater than four it is possible that the **rigidity of space also increases**, and it is this rigidity that we are interested in looking at how deep thought

may interact with gravity. We will explore later how the space-time dimensions could be increased by a novel concept of “Thought Engine”.

One aspect of this rigid space could be that the loss of information from a signal is very little. In the existing four-dimensional space-time world, the attenuation of signal is via $1/d^2$ law i.e., the signal strength reduces from the source by inverse of distance squared. As the space dimensions increase and the space gets rigid, it is possible that the signal attenuation may follow the path as shown in Fig. 2. With increasing rigidity, the velocity of signal also increases and in higher dimensions it could be many times the velocity of light!

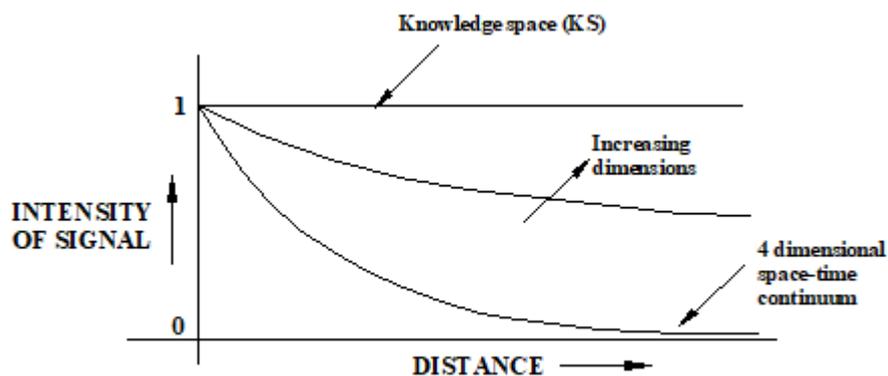


Fig. 2. Rigidity of Space

Another aspect of rigidity of space could be its anti-gravity properties. The bending of regular space-time continuum allows the mass to move and be “attracted” to another body as shown in Fig. 3. With rigidity of space there is a possibility that **space-time continuum could become inverted so as to give it an antigravity property**. This idea is very speculative though worth pursuing.

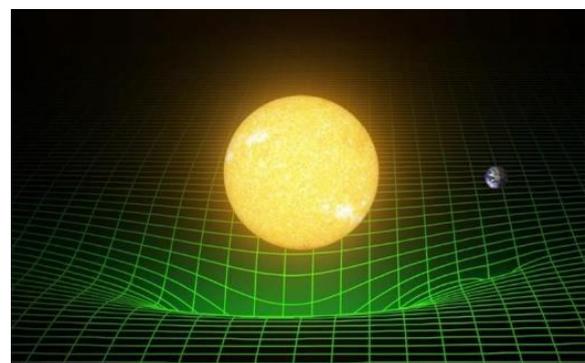


Fig. 3. Bending of space-time by mass.

Knowledge Space

Since the signal loss is reduced drastically in higher dimensions, it is possible that this space may contain structures or memories, which are very stable, and thus an information or knowledge structure will remain there forever [27]. I think a deep thought - hologram structure may occupy this space. In the absence of any better word we can call this space as **Knowledge Space (KS)** and it may contain fundamental knowledge produced in the past and is continuously fed by the ever-increasing knowledge from various civilizations.

A prepared and focused human mind can access knowledge from this space and I feel that the great discoveries of mankind have come from such access [28]. It is also possible that as earth moves around the sun and the solar system revolves around the center of the Milky Way galaxy, periodically we may come across various Knowledge Spaces which may help the mankind to evolve. Similarly, a younger civilization than ours may come across KS developed by us and thus the evolution continues.

The movement of earth and the sun around the Milky Way galaxy is time-dependent (it takes about 226 million years for the solar system to make one round of the Milky Way galaxy) and so could be the earth's encounter with KS [29]. Thus our **discoveries are time-dependent and not person-dependent**. Any prepared mind encountering the KS at a particular time can get that knowledge.

There are many instances in the history of mankind when several people had similar ideas and thoughts at about the same time. Prepared minds encountering KS react in the same manner. Interestingly this also raises the possibility that there may be knowledge cycles since the movement of earth in space is cyclic. We are not sure what may be the period of such cycles, but in ancient texts there are references that it may be anywhere from few hundred to tens of thousands of years. Periodic appearance of great souls on this planet earth may be an outcome of these cycles.

Thought Engine and Production of Matter

It is possible that the transformation of thought from one space-time dimension to another takes place via a **“Thought Engine”**. This is similar to a reversible heat-engine, where energy flows from higher temperature (source) to lower temperature (sink) and in doing so the engine produces work.

Similarly, in the “thought-engine” when a certain dimensional space transforms into a lower-dimensional space, energy or mass comes out and by application of energy and mass, a lower-dimensional space can be transformed into a higher-dimensional space. The transformation from one space-dimension to other is via a quantum jump and hence is not a continuous transition. Fig. 4 shows a concept of thought engine.

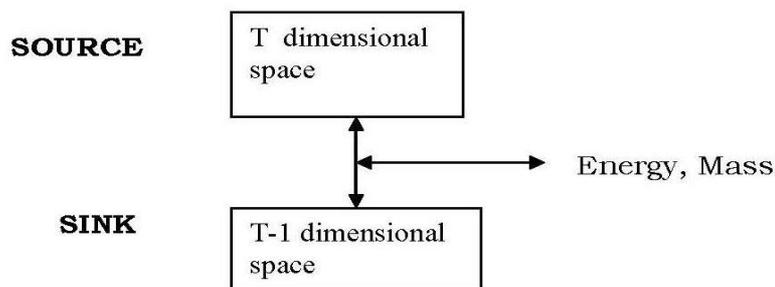


Fig 4. Concept of a reversible “Thought Engine”

If we take this analogy further, then we can conjecture that at the highest space-time dimensional transformation, even the ***time gets sucked in and only space remains***. This is a novel concept which shows that time can be introduced and removed from the universe and hence the possibility that total time in the Universe could be constant. This concept is schematically shown in Fig. 5. The origin and evolution of Universe as depicted in this figure is very much in line with that given in Sankhya philosophy [30].

Maybe the final dimension (which we can call ‘G’) is GOD. Probably it is ‘Akash’ (Sanskrit word for space) or the final entity as discussed by the ancient Indian philosopher Adi Shankaracharya in his famous book Vivek

Chudamani. This 'G' space has always existed with no past, present or future.

We can also conjecture that as time is used (sucked in) for transforming lower dimensions into ultimate 'G' dimensional space it is equivalent to energy and since it devolves into ultimate space it may have geometric properties. Thus, it is possible that $\text{TIME} \Leftrightarrow \text{ENERGY} \Leftrightarrow \text{SPACE}$. Since time is the last thing to devolve, it is possible that our present world may have time dimensions. We are however not sure what those dimensions are. Also, as time is the last thing to be absorbed, ***it is theoretically not possible to go back in time!***

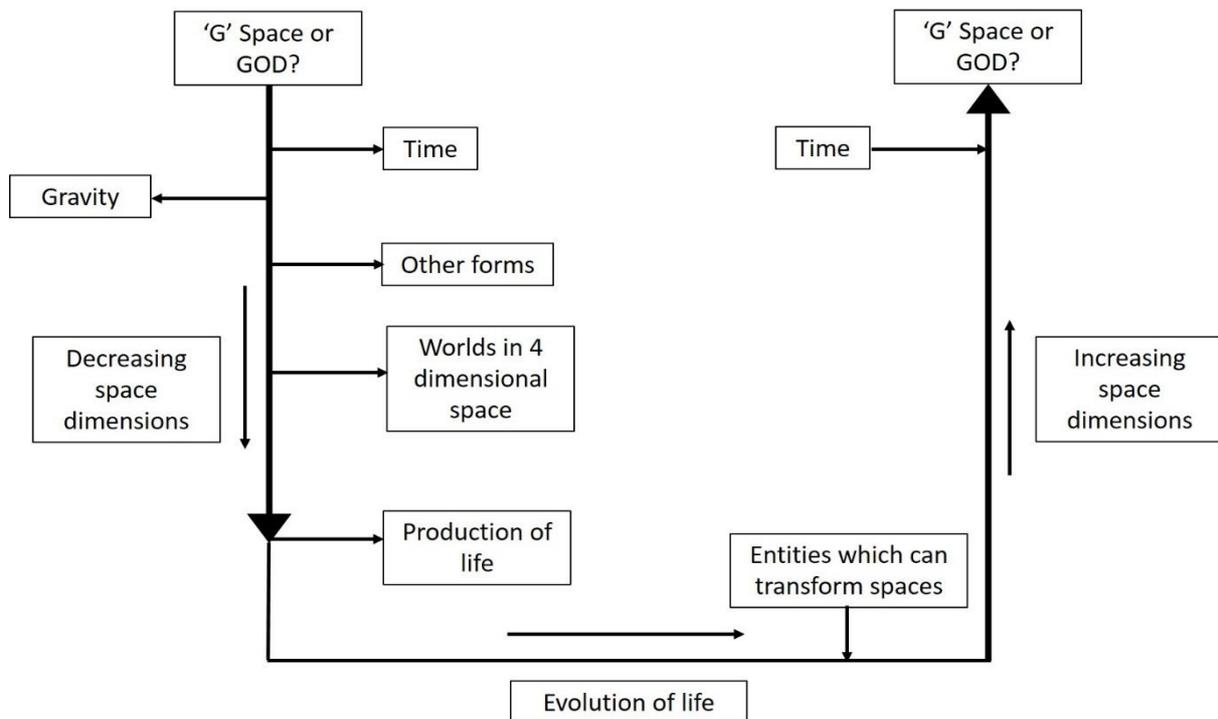


Fig.5. Possible evolutionary model of life

Another outcome of this idea is that as ***our minds are the product of Universal time frame it is theoretically not possible to fully comprehend the "Mind of God" (which is beyond time) and get the theory of everything!***

Thought engine also provides a possibility of annihilation and production of matter and I feel that it is at this level that deep thought and gravity could be related. This could also be a mechanism by which some Yogis claim to produce material from thin air and could explain the poltergeist phenomenon! This is similar to what modern physics describes as production of matter from vacuum [31]!

Similarly the concept of thought engine also opens up a possibility of higher dimensional-based form-templates being transformed into matter and hence creation of completely new designs and inventions. Besides, it also provides a mechanism by which personal consciousness is connected to Universal Consciousness since we can reach space 'G' through deep thought. ***Thus deep thought, matter, space, time, and Universal Consciousness are all related.*** With this relationship it may be possible to find out how we can get Universal knowledge and may progress towards understanding the Mind of God.

Thought and Gravity

We have conjectured that deep thought is geometric in nature. So is gravity and hence it is possible that they may be somehow related. ***Thus deep thought may bend the space-time continuum similar to that done by gravitational mass.*** This interaction might take place in higher dimensional space. Also as mass could be produced and annihilated via a thought-engine during transformation of spaces, it is possible that deep thought and gravity maybe related at a deeper level.

As was stated earlier there is a large body of psychokinesis data from all over the world attesting to the interaction of mind and matter. Thus production of materials from thin air; changing their property by application of thought only; levitation; etc. have been reported by people throughout the ages and from all different civilizations [32]. Sage Patanjali in his Yoga Darshan states that with Sanyam on various objects, a Yogi gets power to master nature so that he can fly, become invisible, move objects by thought and make the human body a very powerful instrument for knowledge gain

[33]. All these things can take place only when deep thought and matter are interrelated and hence can interact.

Deep thought is a product of almost 100 billion neurons firing in a laser-like fashion. Similarly it may be possible that gravity manifests only when a very large number of particles are involved. ***Both gravity and deep thought therefore could be an outcome of large-number mathematics.*** The exact nature of how it takes place is presently not known.

We can only measure gravity with masses of the order of milligrams [34]. According to physicists below this mass it is extremely difficult to measure gravity since gravitational forces are very weak. Nevertheless, even a milligram of substance contains billions and billions of atoms, and it is possible that these large numbers produce (possibly through the movement of electrons and atoms, etc.) a signature called gravity. This concept is very conjectural in nature. However, it is quite possible that ***movement produces the necessary structure which could be either thought (firing of neurons) or gravity (movement of electrons etc.).***

Movement is an outcome of time and as we saw in Fig. 5. gravity itself resulted when space started flowing. Without time there is no movement and ultimately everything devolves into 'G' space.

Gravity Antennas

That the ancients knew about the effect of gravity on human soul is also attested to by the superstructures built for kings and queens' burials. It can therefore be conjectured that the Egyptians built the massive pyramids as gravity antennas for passage of soul. The biggest Giza pyramid is estimated to weigh 6 million tons and the King's and Queen's burial chambers are close to and equidistant from the center of gravity of the pyramid [35]. It is quite possible that the ancient Egyptians understood that localized gravity might help the passage of soul through intergalactic space. Alternatively, it is also possible that a pyramid might act as an antenna for deep thought or

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Universal Consciousness to help resurrect the King and the Queen! I feel the same laws may have been used by the Yogis when they meditated inside deep caves in mountains. The mountains could have acted as antennas for reception of universal knowledge.

Similarly there are many instances in Indian Yogic tradition where highly evolved Yogis and enlightened individuals left their body with full knowledge of conjunction of planets and stars. Thus in Mahabharata it is mentioned that Bhishma Pitamah stayed on the prickly arrow cot for six months before he left his body during “Uttarayan” (Sanskrit word for sun rising from north) when the sun was closest to earth in winter [36]. Similarly Vivekananda and Shri Ramakrishna - two great Yogis of India in the 19th Century left their body by will, after detailed understanding of planets’ conjunction through the almanac [37]. In ancient Indian text of “Brahma Sutra”, it is stated that the soul guided by Sun’s gravity reaches a space called heaven.

At another level, the earth’s gravitational field might have helped in evolution of life on this planet. The molecules of a certain size became “living” when they resonated with the gravitational field of the earth. Since movement is an outcome of time, it is quite possible that at this juncture the concept of time also got embedded in the "living" systems. These could be the “critical size” molecules, which were essential for evolution of life. We do not know what this critical size was, but these molecules effectively became gravity antennas.

In nature all the forces acting on a living entity help in its evolution. Gravity forces are the largest force acting on any organism on this planet earth. Hence it is natural and quite possible that gravity helped in life’s evolution. It may be interesting to test this hypothesis by taking the “critical size” molecules in the zero-gravity environment of outer space and to see whether they replicate and transfer the genetic information-the basic prerequisite for life.

Alpha Waves

The interaction of deep thought and gravity can also be seen in the interaction of alpha waves with earth [38]. Alpha waves are produced in the brain when we are in meditation or relaxing. These waves are generally in the range of 8-12 Hz frequency. The earth diameter (~12,800 km) is such that it can have a standing half-wave of 11.7 Hz (close to 12 Hz). Is it therefore possible that our brain evolved in such a manner that the earth's geometry influenced the alpha wave production?

Incidentally scientists have also discovered that before major earthquakes an electromagnetic wave of 0.01-10 Hz comes from deep inside the earth [39]. This wave is sometimes sensed by animals and could be the basis of reported earthquake prediction by them. In some other habitable planet the living beings may have different alpha waves depending on the geometric shape and size of that planet. Similarly, life on other planets may evolve according to their gravity field besides the effect of other environmental variables.

Interestingly the relationship between alpha waves and earth's geometry may have other implications. Practitioners of Bhakti Yoga and Buddhist traditions have always stressed the need to allow full flow of thought waves without any interference from ego or sense of identity ' I ' for achieving Samadhi. Bhakti Yoga says that one should completely sublimate ' I ' by abandoning oneself to God or Universal Consciousness.

Similarly Buddhist lamas of Tibet suggest that one should try to relax so that the ego stops interfering in thought production. I feel both these practitioners are intuitively trying to allow the mind to follow the alpha wave pattern. Thus when mind gets tuned to the gravitational field of the earth, meditation and Samadhi results!

Besides gravity, earth's magnetic field may also affect the thought process [40]. A human brain produces a small electromagnetic field. The

measurement of this field by EEG shows the activity levels of the brain, whether it is producing alpha or other waves [41]. Any weak or powerful magnetic field may therefore affect its working and hence the thought. Our present age is an electric age and thus we cannot help being engulfed in electromagnetic (EM) fields. Whether they are from our cell phones, or overhead high voltage wires, or microwave ovens, MRI scans, etc., we are continuously being bathed by them and cannot escape them. These man-made fields together with the fluctuations in earth's magnetic fields created by solar storms provide a large number of possibilities of affecting the human thought process.

Both gravitational and magnetic fields, all around the world, vary slightly from their mean values. Since they can affect the working of the brain, it is possible that some places maybe more conducive to creating deep thought and creativity [42]. This could have been one of the basis of setting up temples and holy places all over the world.

Our present science is based on reductionist principles. We believe that once we find the basic building block then we can construct the whole universe around it. Thus the physicists all over the world are building bigger and bigger atom smashing machines to smash the matter and discover that ever elusive building block. I feel we are looking at the wrong end of spectrum. ***Interaction of large number of variables producing their unique signatures may provide a mechanism to link all the various forces of nature.*** Hence our thesis of deep thought and its relationship with time, mass, space, Universal Consciousness, and knowledge maybe a step in the right direction.

In the annals of human civilization, quantum jumps in our understanding and knowledge have taken place when a great thought has been produced by persons like Buddha, Christ, Kepler, Newton, Einstein, etc. It is quite possible that a similar quantum jump may take place when a relationship is discovered between human thought, consciousness, and matter. It might

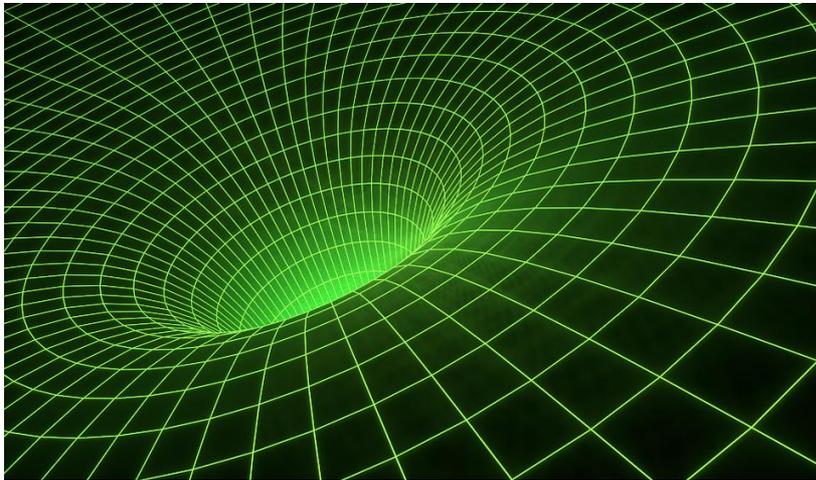
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help explain two of the major mysteries of our times – consciousness and gravity. Then we might progress on the path of knowing the mind of God [43].

This article was published in September 2020.



59. Touched by Light: A Conjecture on how Gravity and Human Thought maybe related



In late 1977 I was walking through a thick pine-grove in Gainesville, Florida, USA when suddenly a thought came out of blue that gravity and human thought may be related.

I was not thinking about this relationship, or anything connected to gravity at that time, and hence was taken aback by this thought and felt that it must be true since it came with such a force. The power of this thought was such that I spent next 3-4 months researching it and, in the process, neglected my Ph.D. research. I also felt that pine-grove acted as an antenna for getting such a thought [1].

This event also propelled me to start investigating the area of mind-matter interaction and other aspects of spirituality [2,3]. In fact, whatever little I have done within this realm in the last 40 years was triggered by this single thought.

Though I understood intuitively the import of this thought at that time and even today, somehow the relationship between deep human thought and gravity has remained elusive. Recently it appeared that there may be a light at the end of the tunnel! And this essay is my humble attempt to show how the human thought and gravity may be related.

The relationship is based on the idea that deep human thought is a very stable hologram - a light signal and may react with gravity [4]. This idea is explored in greater detail in the following sections.

According to the general theory of gravitation light bends around massive bodies [5]. This is because massive bodies distort the space-time matrix and the shortest path for light travel is a geodesic and hence light appears to bend when it passes heavy bodies like sun. This was one of the great triumphs of Einstein's theory of gravitation.

Since gravity bends light, we can conjecture by principle of equivalence that light should also bend the space-time matrix! This is the line of thinking we will employ in our quest to find the relationship between deep human thought and gravity.

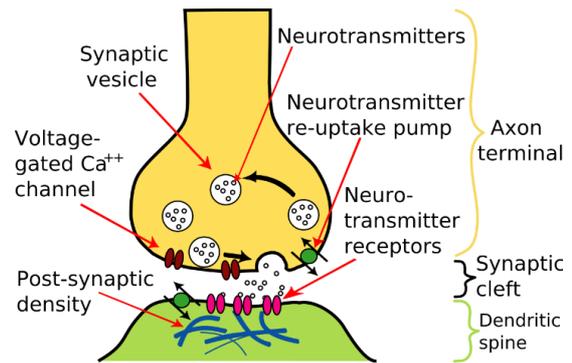
Human thought as a hologram

It is an accepted fact that thought is produced when brain neurons fire. There are close to 80-100 billion neurons in the brain (the exact figure is not known) [6]. For a simple thought like what is the colour of a flower, open the door, etc. a small portion of the neurons fire but in deep concentration leading to *Samadhi* and *Sanyam* (combination of concentration and contemplation on a single subject or object for a long time) almost all the neurons fire to produce a deep thought [7,8]. Thus, the difference between deep and shallow thought is its intensity.

Activation of neural pathways triggers firing of neurons. This activation is triggered either by signals from sense organs or stimulation of certain memory space in the brain. Firing of neurons helps them to communicate with each other. During this communication electrical signal from a neuron is converted into chemicals (neurotransmitters) and transmitted across the synaptic cleft to another neuron where it is again converted to electrical signal for onward journey [9].

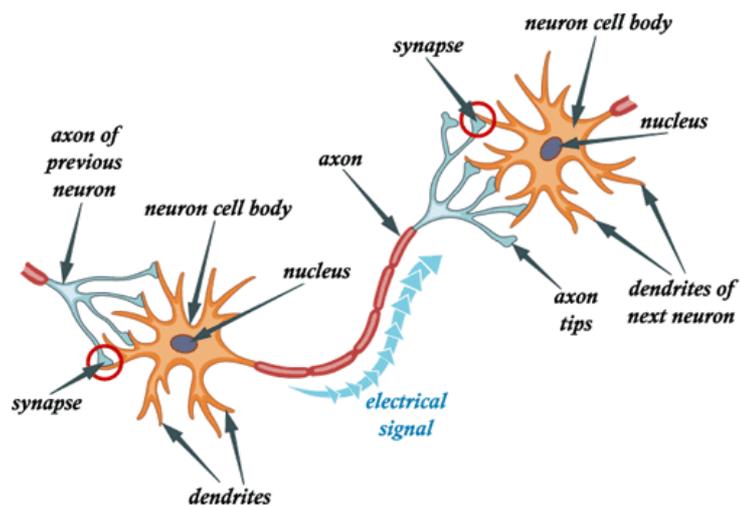
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Synaptic cleft is a tiny space of about 20 nanometres (nm) between an axon and a dendrite and is the place where two neurons exchange information via neurotransmitters (NT) [10].



A neuron has three parts. At one end is dendrite which accepts NT from other neurons; the central nucleus which is the heart of neuron and a long nerve fibre called axon whose end (synapse) releases the NT for transmitting to another neuron.

Why did nature produce this type of communication system where the electrical signal from the neuron is first converted into chemicals (neurotransmitters), and transmitted through synaptic cleft and again converted back into electrical signal?



A possible answer could be that during this conversion in synaptic cleft, photons are produced which are the signature of thought. Anytime a chemical reaction takes place (production of NT is one such reaction) it produces weak photons. This is the nature of the chemical bond.

Weak photon production (in far infrared region) was experimentally observed in the brain in the late 2010s when scientists detected them being emitted during the firing of the neurons and transfer of neurotransmitters across the synaptic cleft [11]. Scientists are still not sure in what way brain uses these photons but speculate that somehow, they may help in increasing communication between various parts of the brain.

I conjecture that these photons from a large number of neural pathways synchronize via a non-linear process to form a ***three-dimensional hologram which we can call a thought***. Hence the origin of thought probably occurs in the synaptic clefts!

Each thought however is the result of activation of a unique set of neural pathways though we still do not know how many neural pathways are needed for it. Just to give a sense of complexity of brain let us look at the numbers of possible neural pathways in the brain.

There are close to 80-100 billion neurons in the brain. Each neuron has many dendrites and axons which connects it to other neurons. Recent scientific evidence also suggests that besides neurons another type of cells called glial cells take part in communication. Glial cells outnumber neurons by nine to one and can modify the signals transmitted by each neuron. There are therefore estimates that 10^{15} synapses in the brain maybe involved in communication [12]. Thus, the number of different combinations for neural pathways and thought production are mind-boggling. That is the reason why human mind can generate millions and zillions of thoughts!

However, the photons from each synapse have to be synchronized with others to produce a stable thought structure. This synchronization takes place via the positive feedback type mechanism so that each photon is influenced by others and is guided by an entity called 'I' (ego, will, sense of identity, etc.) [13]. Ego acts like a symphony director and helps provide the necessary energy and focus to maintain a given thought for a certain time [14]. It also constantly compares it with signals from outside to give us a sense of reality.

We still do not completely understand how 'I' can influence this process, but just like the music conductor who determines which part of the orchestra plays for how long, 'I' decides how long a particular thought will remain in

the “vision” field. This process is called concentration and seems to also exist in other animals.

Interaction of light with gravity

Einstein’s general relativity and gravitation theory has shown that light (photons) is bent by heavy bodies. Gravitation theory also shows that a combination of energy and momentum can curve space-time matrix.

Though photons are massless particles, yet they have energy and momentum – two important attributes for bending space-time matrix. Thus, light travelling through space-time should be able to change the matrix shape. However, the effect is miniscule and is extremely difficult to measure since photons have very little energy and momentum. Recently some theoretical studies have shown the effect of lasers on space-time matrix deformation [15]. Thus, light interacts with the gravity field so that not only is it bent by it but can also change it.

If we extrapolate on this idea, then it can be conjectured that an extremely focused human thought-hologram might act as a laser and could interact with gravity. Besides, it can also become a soliton and may reside in the knowledge space forever [16,17]!

Soliton is a wave which can remain stable for almost infinite time and can travel to great distances without dissipating [18]. These waves arise because of the non-linearity of the wave phenomenon and have been observed in liquids, gases, optics and even in space. ***It is possible that a deep human thought-hologram may interact with space-time matrix in a non-linear manner to produce a soliton.*** The word soliton is apparently derived from solitary wave which being stable almost acts like a particle. Hence soliton rhymes with electron!

It is also possible that a thought-hologram soliton may interact with space-time matrix to produce large mechanical effects. This process could be explained by the science of resonance [19].

All systems in the Universe possess natural frequencies and when those frequencies are reached large scale mechanical effects are observed. A classic example is the child on a swing. A slight push at the right time and place to the swing can make it go higher and higher.

Similarly, certain notes played on musical instruments can shatter wine glasses [20]. In the same manner some of the modern bridges were destroyed when the marching steps of the soldiers matched the natural frequency of the bridge.

All these effects show that an exceedingly small force can create large mechanical changes when the natural frequencies of the system match the mechanical force affecting it. This is the genesis of Butterfly effect generally described in chaos theory and is an outcome of non-linear dynamics of the system [21].

It is therefore possible that deep thought-hologram soliton may somehow interact with the space-time matrix in a non-linear way and can affect large scale mechanical changes.

This process may be able to explain the movement of physical objects by thought (psychokinesis) and poltergeist phenomenon where the presence of a troubled person brings in abrupt movements of the physical objects like stones, furniture, etc [22, 23].

I also feel that it is this soliton thought wave that may be responsible for *Mahasamadhi* of great rishis and enlightened souls by which they could leave the body at will guided by celestial bodies like sun and stars [7]. It is as if the physical structure of brain and the body is required to reach the stage of highly non-linear thought and once the soliton is achieved the body's function is over and the liberation of a being from the cycle of birth and death results.

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It is also very tempting to speculate that production of thought soliton artificially and its interaction with space-time matrix may provide a possible propulsion mechanism for intergalactic space travel!

The article was published in March 2021.



60. Layers of Reality – Ghosts and other entities

All over the world, and in every civilization, large number of cases have been reported about ghost sightings, poltergeist incidents, production of materials from thin air, out of body experiences and other paranormal phenomena. Quite a large number of them can be thought of as trickery or sleight of hand-type events, but few of these phenomena have remained a mystery. Nevertheless, all these cases point towards the possibility of reality or layers of them, which is beyond our level of perception and out of our four-dimensional world.

So, a curiosity arose regarding the nature of this reality and entities and what is the possible cause of their existence. This is the subject of this essay.

However, a question can be asked as to why are we interested in knowing about these layers of reality and what benefit will it be to us especially when it does not affect majority of people? Isn't ignorance bliss?

The primary reason is that humans have an inherently curious nature to know about unknown and gain knowledge. The second reason is that quite a number of people are fearful of the unknown and hence are influenced by *tantriks*, witch doctors etc. who claim to have control over these entities. Thus, they spend huge amount of money on these *tantriks* or witch doctors who play on their fear and insecurities and in quite a number of cases these *tantriks* have destroyed the family life of people seeking their help. If people become aware of this reality and understand its cause and nature, then their fears will be reduced.

And finally, in some cases these entities influence the thought process of some people and in few cases have even changed the course of history of mankind. For example, Koran was supposed to have been "dictated" by an entity archangel Gabriel to Mohammad. Similarly, there are claims that

Hitler, who was a mediocre soldier, showed occasional brilliant war strategy guided by a shining being. It was also claimed that he was a medium for some of these entities.

Also, some of the great ideas and inventions have come suddenly in the dreams [1]. Normally this is termed as power of prepared mind but in some cases the vivid dreams had people instructing the dreamers on the revolutionary idea. Similarly, some of the great discoveries of mankind have come out of thin air as if the benevolent entities dictated them to humans who acted as their medium.

I feel that humans have always been used as an instrument or medium by these entities since this is possibly the only way for them to express themselves and physically manipulate events. Mahatma Gandhi spoke many times that he was an ordinary person but sometimes “truth” spoke through him and then he reached a level of superhuman being.

Hence it is in our interest to know a little bit about these entities and layers of reality.

Perception of reality

We can perceive these layers of reality by expanding our consciousness through a powerful brain. A powerful brain (or processor) is one which can focus and concentrate on a single thought for a long time. This process is called ‘Sanyam’ in Patanjali Yoga [2]. Such a powerful mind can process information from sensory inputs very effectively and hence becomes “hungry” for more information and experience. This is the basis of mind-expanding process.

One of the aspects of such a powerful and evolved brain is that it also becomes acutely aware of its surroundings. This happens partly because of the need for maximization of experience and hence the brain seeks ever-expanding spheres of experience. Thus, it is able to expand its horizons to

encompass our world, solar system and universe. This expansion also gives us a tremendous sense of peace, tranquility, and perspective on our life. ***This is the genesis of wisdom.***

Another reason for enhanced awareness is that a powerful brain also becomes an enhanced signal receiver and can easily get information and knowledge from external sources including the knowledge space (KS) [3]. Knowledge space (as the name implies) is filled with knowledge both from present and past civilizations and this knowledge can be assessed by the prepared mind. This is akin to cloud computing in the cyberspace [4].

There are large numbers of instances of advanced Yogis, scientists and inventors who have discovered the universal truths by plucking them from the knowledge space. This requires preparation and tremendous concentration of the mind for a long time and is akin to Sanyam of Patanjali Yoga [2].

Majority of ordinary people who are weighed down by mundane things and are caught up in overload of information, do not become aware of the higher reality. They are constantly reacting to the events around them and do not have time for themselves. Only when we sit still and think deeply that we start increasing our brain's processing power and become aware of higher reality.

Production of a huge human brain is still an evolutionary mystery. Its big size cannot be explained by the pressures of evolutionary forces alone. I feel that it developed so that we can understand the universe and become aware of the Universal Consciousness [5].

This expansion of our horizons or yearning for Universal Consciousness gives us an awareness of reality and life in different dimensions [5]. Sage Patanjali has spoken about this reality in one of his shlokas where he says, *“When a Yogi is fairly advanced in his Sadhana he will be approached by*

celestial beings. The Yogi should be careful about such a contact and there should neither be attachment or surprise, for undesirable connections can occur again". Interestingly Patanjali does not discuss the nature of these beings and what their attributes are. Nevertheless, the yearning for soul to get away from the influence of these entities is eternal [6].

Many modern saints like Ramakrishna, Vivekanand and Aurobindo Ghosh have spoken about these entities and have always stressed that one should not get entangled with them. That these highly advanced Yogis spoke about them meant these entities exist.

Nature of entities

So, what are these layers of reality? These could be energy packets in ghost forms and are differentiated into their layers of existence by the energy they possess. This is just like a quantum state of an electron in an atom where the electron energy level corresponds to various levels of its existence.

The higher energy level electrons are farthest from the nucleus whereas the lowest energy level ones are closest to it. Similarly, the lower entities remain attached to the earth's gravity field and for their stability feed on the psychic energy of individuals. This could also be the basis of Shamanic rituals and religion. In fact, the whole basis of "sacrifice" (both life and food) ritual and offerings to gods might have originated from this concept.

It is also possible that these ghost forms are strong memories of physical beings-both humans and animals and sometimes result when unnatural deaths take place [7]. When these psychic energy structures interact with humans and animals they are capable of influencing their minds and make them exhibit the latent tendencies of their past existence. Thus, they can continue to "live" through the medium of other physical bodies and could be the basis of possessions that have been witnessed in all civilization since time immemorial. They get attached to those who "**will them**" and sometimes it is difficult to get rid of them.

Lots of *tantriks*, charlatans and so-called miracle ‘god men’ have close interaction and connections with some of these entities. These entities do their bidding but also demand their pound of flesh which is why most of these ‘god men’ fall prey to their own shenanigans and these spirits. Thus, it is best to be always wary of such influences and to keep away from them.

How are these entities formed? It is possible that these entities are ghost structures which remain stable even after the physical body is dead. What is the nature of this structure, how it remains stable and what sustains it remains a mystery? It is also possible that the ghost form is a template of the physical being and takes time to “dissolve” after the physical death and this form somehow in some cases becomes stable and is fed by the psychic energies [7]. In Indian mythology this ghost form is sometimes called “*Sukshma shareer*” (subtle or ethereal body).

This is almost similar to Prigogine’s dissipative structure which remains stable because of the energy feeding it. One example of a dissipative structure is convection currents in a body of water heated from below. The heated water rises in the container and is replaced by the cold water from top and thus the convection current is developed. This convection structure exists as long as the container gets energy from the heat source. Similarly, the ghost structure exists as long it feeds on psychic energy.

The higher energy entities lose lots of their negative attributes and are the benevolent gods that almost all religions talk about. Indian and other mythologies talk about many instances where great souls have come and “settled” on earth to help earthlings and it is said that they have remained ethereally on this planet. It is also possible that all these god-like entities are pulled on this earth by the active memories of the living beings. In Bhagwat Gita, Lord Krishna tells Arjun that he will come to earth and will be born again and again whenever there is *Adharma*.

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Similarly, all great heroes, yogis and enlightened human beings after their death reach the status of gods since they are actively remembered by humans. The continuous remembrance by large number of humans creates a stable structure for that god entity.

The best way for us not to be involved with the lower entities is to never ask them for any favors. Majority of humans want a magic wand to get over their fears and insecurities and hence become an easy prey to *tantriks*, soothsayers, etc. If we actively work as *karma yogis* on our insecurities, then we do not need the help of these entities.

We should certainly remember the higher energy entities and the benevolent gods, but we should ask them for favors of vivek, wisdom, better minds and how we can help in the betterment of mankind and not for mundane and petty personal favors.

The awareness of higher dimensional space and reality can also make us fearless and remove our fear of death since death is a simple transition between various forms and dimensions [8]. This is also the lesson of Gita. With fearlessness comes the ability to do new things and follow uncharted paths which can give us a quantum jump in our spiritual and technological developments and understanding of natural forces.

This article was published in June 2012.



61. From Personal God to Universal Consciousness



What is God? Throughout the history of mankind, we have grappled with this question. Everybody has their own definition of God. Some believe in it some do not, but everybody talks about it.

Most people have faith in personal God [1]. It provides a psychological pillar of support to them and feel that God will help them overcome difficulties. It is their strength of faith which really helps them rather than anything else. Still, they pray to him and offer huge bribes of donations and offerings in the temples! When things do not turn out the way they want, they rationalize that God willed it so.

This is the nature of our brain and mind which makes us believe that some higher entity helps us or will help us so that our lives become better. This belief basically provides mental support so that in the time of crisis it gives us faith and provides solace.

Generally, God concept is thought of in two ways. Personal God who helps (or is supposed to help) in our personal lives and the faith in it propels us to do things. Most of the times it is a ritual with hardly any deep faith. A deep

faith in personal god was displayed by the Indian saint Ramakrishna who used to say; one can play with, tell him/her the innermost secrets, etc., etc [2]. He was so immersed in his personal god that it was basically his invisible playmate. He exhibited *Bhakti Yoga* in its pure form [3].

Then there is the Universal consciousness which is beyond the personal realm. Patanjali in his Yoga Sutras talks about it as an entity which is beyond time and space and yet guides the destiny of the Universe [4]. That is the type of God that Einstein also believed in when he said that God is nothing else but the profound beauty of Universe and its structure.

So how do we reconcile the personal God with the Universal God and how are they related? I would like to explore these issues with the help of my personal examples.

Early spiritual experiences

I had spiritual experiences from age 13 to 15. These came when I started meditating for couple of hours every day [5]. Later on, there were many interesting dreams which may be termed as a part of the spiritual experiences.

The early experiences were about the great feeling of oneness with most living beings and also fantastic dreams of getting bathed in very intense white light.

Somehow these experiences made me feel that somebody is watching over and protecting me. It was a good feeling. At that young stage in life the closeness of somebody like that is particularly important and comforting.

One episode brought this out very clearly to me. I must have been about 14-15 years of age. I always had the habit of sleeping after lunch. This habit has continued even today. So, after sleeping for an hour, I woke up to go to the bathroom. In the bathroom I had a blackout and fell down. During this

blackout episode I suddenly “saw” that somebody had tied me up by a rope and I was in a foetal position. I also felt that the person was taking me away when another being came and untied the ropes and I regained consciousness. I never saw the faces of these beings but felt that somebody who was watching over me helped me escape.

Dr. K. N. Gairola, my father’s friend and our physician was called to our house [6]. He checked my B. P. and other vital signs and said that maybe I needed more vitamins. I used to be as thin as a stick and with my experiments in eating only vegetarian food and fasting, the necessary ingredients required for a healthy body were not being made available to it [5].

I never believed in any rituals and was dead against going to temples or offering “*Prasad*”. This belief came because of my early spiritual experiences that there is a higher power which is beyond form, and which helps in knowledge giving.

When I went to do engineering in IIT Kanpur and later on to the U.S., somehow the issues of spirituality were put on the back burner [7]. However, the engineering and other education in US dramatically expanded the field of vision and I became extremely interested in gravity and astronomy [8]. It also allowed me the luxury of looking at the world in a holistic manner and I was amazed to discover the inter-connection of almost everything in the Universe.

This mind-expanding exercise gave me a new perspective on the powers that govern the destiny of the Universe – and understanding that we, such puny little creatures, consider our small surroundings as the centre of the Universe!

This clarity of thought did not materialize at that time, but the seed was planted, and it was almost 25-30 years later when I became heavily involved

in writing on issues of spirituality that it became clear. I then realized that God is nothing else but this marvellous Universe which follows its own scientific laws [9].

Thus, from my own life I realized that when we do not have knowledge about the greater world then the personal god provides the psychological support. As the mind-expanding knowledge is perceived, the personal god is replaced by the Universal Consciousness. Both however can provide tremendous faith and psychological support during personal crisis.

Universal Consciousness

Faith in Universal consciousness comes when we develop a powerful mind. A mind which can question and analyse deeply all the issues also becomes spiritual. That is the whole basis of Yogic *sadhana* or spiritual realization. I believe all of us who are searching for the truth in any field reach this space of spiritual awareness sooner or later.

The quest of Universal consciousness or Cosmic God is also taught in our ancient scriptures like Bhagavad Gita and Patanjali Yoga Darshan where it is shown that this consciousness can be attained if we expand our minds and make them powerful through *Sanyam* [4,10].

Without such expansion we will be guided by lower forces of spirits and entities which surround our planet, and which give rise to the concept of personal god [11]. Most of such god worship world over is shamanic in nature [12]. Even Patanjali has written in his Yoga Sutra that as the *Yogi* advances in his *Sadhana* he will be tempted by such beings, but he should be careful not to get entangled with them [11].

Sometimes the misplaced faith in personal god leads to religious fundamentalism. This happens because of the person's insecurity and a desire to control. World history is full of examples and testimony to the

religious wars where large number of human lives have been lost because of religious bigotry.

I feel this bigotry can be reduced if we give all rounded education to our children with emphasis on bigger issues in life; love for science and technology; emphasis on ethical behaviour; and knowledge that all the different faiths of mankind are important but different paths to achieve the truth. This will help expand the children's horizon and make the world a harmonious place to live.

Einstein's Example

Einstein has been one of my heroes [12]. His life and work have influenced me deeply and I have always been inspired by his spirituality. His biography shows that he used to write poetry and sing hymns in praise of a personal god when he was 12 years old [13]. As his knowledge about the forces affecting us and how the world is made grew, his focus on the personal god petered out and a whole new world of beauty and awe was revealed to him.

In later years he was able to easily replace the notion of personal god with that of Universal consciousness. He always said that he believed in God who reveals himself in the harmony of all that exists [14]. I think he was a very spiritual person in a true sense.

All his life Einstein worked towards developing a theory of everything – basically the relationship between quantum physics and gravity [15]. However, he did not succeed. The forces in quantum mechanics which bind the matter in atoms are extremely powerful and gravity does not play any part at such nanoscales. Only at a greater distance and with bigger masses, the gravity becomes the most dominant force. Thus, the holy grail of all science is to find a relationship between gravity and other forces working in nanoscale regions like electromagnetic, nuclear, etc.

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In the same way the effect of personal god becomes powerful when we are cocooned in our own petty affairs and without the knowledge of greater forces affecting the universe. The transition from personal God to Universal consciousness happens when we become aware of those universal forces. That will be an important step in mankind's evolution both spiritually and technologically [16].

To my mind the theory of everything will be discovered when we understand God both at the personal and universal level.

The article was published in July 2021.



62. Spiritual Nature of Discovery

Last month was 125th birth anniversary of famous Indian mathematician Ramanujan. He was a spiritual mathematician and always said that all his equations and mathematical insights express the thought of God and considered them as a gift from Goddess Namagiri [1]. Hardcore mathematicians scoffed at his metaphysical pronouncements and yet he pioneered number theory and laid its foundation through his theorems which are still being proved and deciphered after 100 years by some of the top mathematicians of the world.

Similarly, the great discoveries of Newton, Einstein, Tesla (the giants of humanity) have all bordered on the metaphysical. Half of Newton's life was devoted to understanding the scientific principles behind God and he devoted a substantial part of his life in writing about them. Einstein also wrote songs about God, which he used to sing to himself [2]. Besides, he was a strong believer in the relationship between science and spirituality. He wrote, "I maintain that the cosmic religious feeling is the strongest and noblest motive for scientific research" [3].

Tesla - one of the greatest inventors of last century seemed to periodically pluck his inventions from thin air. He always said that most of his ideas came in a flash and the whole machines, and their detailed working were "shown" to him [4]. Similar was the case of Barbara McClintock who had a metaphysical experience and "saw" the phenomenon of jumping genes which later on won her the Nobel Prize in Medicine in 1983 [5]. However she was ridiculed for almost 20 years because such metaphysical insights are not considered a part of mainstream science.

It seems that all the great discoveries, inventions, and creative outputs like composition of classical music by Bach, Beethoven etc. have been the result of mystical experience. Though most people consider this as a product of a prepared mind, yet ideas which are revolutionary, change the course of

mankind's history or bring in quantum jump in our understanding are a product of a nimble brain which somehow plucks the knowledge like magic from knowledge space, especially when no physical proof exists. Sometimes it appears that Gods smile on a chosen few who are blessed with a great idea whether in the realm of philosophy, science, mathematics, or music. An element of spiritual connection seems to exist when a great thought or discovery takes place.

Patanjali the great Indian sage has spoken about this connection when he says that any knowledge of the Universe can be obtained by *Sanyam* on it [6]. *Sanyam* is a combination of concentration, contemplation and samadhi on any idea. All great discoverers like Einstein, Newton, Tesla, Darwin etc. were endowed with tremendous power of concentration. This together with prepared mind helped them in the discoveries.

The practice of *Sanyam* also points to the fact that those not blessed with nimble brain can produce a powerful prepared mind by sheer hard work.

An interesting facet of discovery process is that most of these great discoverers were self-taught. Their genius flowered at an early age by a single event either by being exposed to a book (in the case of Ramanujan or Enrico Fermi or to a compass (in the case of Einstein) [7]. Such innocuous events triggered in their minds, as if by magic, a tremendous hunger for knowledge.

Also, all these great thinkers talked about oneness of everything. Half of his life Einstein struggled to develop a theory of everything in which he wanted to connect every aspect of universe. Similarly, Ramanujan, Tesla, McClintock etc. all talked about oneness of life and they all wanted to see the inter connections in everything surrounding us.

With deep thought or *Sanyam* on a particular thing for a long time the brain can become very sensitive and a powerful receiver of knowledge. Such a

sensitive brain can identify itself with any idea or object in the world and gets a feeling of oneness of the Universe. Once Shri Ramakrishna, while in a heightened state of awareness, saw a person walking on the grass and felt as if that person was walking on his chest! He had identified himself with the grass as if it was an extension of him. Nevertheless, it is the human mind which is the receiver of the idea or knowledge, and there is a curiosity to know what is the mechanism by which it happens.

Knowledge is of two types – internal and external. The internal knowledge is the outcome of memory and information stored in the brain and its churning and processing by *Sanyam*. External knowledge is gained when the deep thought interacts with the object of perception. This interaction takes place when the prepared mind produces a thought whose template starts actively matching with the object of perception and with *Sanyam* on it the thought template eventually matches the object in a lock and key type interaction leading to its complete knowledge.

The knowledge about the Universal Consciousness or God or what is the structure of Universe already exists in knowledge space (KS) and is accessed whenever the earth passes through this space in its long journey around the Milky Way [8]. Hence it is time-dependent and not person-dependent. Even if there were somebody else other than Newton or Einstein, they would have received the knowledge provided they had a prepared mind. It is also the reason why quite a number of people with prepared mind get similar ideas simultaneously and independently.

The renaissance period in Europe and spiritual awakening in India in late 1800s are some of the examples when a large number of enlightened souls pushed the frontiers of knowledge. As the earth passes through the KS it somehow attracts great thought which comes in a human form! This may be the easiest and energy wise most efficient way for knowledge seeding of earth.

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Thus Christ, Buddha, Ramakrishna, Einstein, Newton, Ramanujan, and many more like them were all great spiritual beings who came on this planet earth to increase the knowledge of mankind.

This article was published in January 2013.



63. Cosmology according to Sankhya and Science

Since time immemorial human beings have been intrigued about their origin and that of the Universe. Various reasons ranging from God to big bang have been given for the creation and even today with some of the best brains working on it with huge amount of research money and resources the mystery of our origin still remains.

Nevertheless, the old Sankhya philosophy provides a possible explanation for the origin of Universe and comes quite close to the accepted scientific explanation.

According to Sankhya philosophy the interaction of Purusha and Prakriti produces matter and the worlds [1]. Purusha is described as omniscient, omnipresent, and indivisible entity. Prakriti (nature) which is always active interacts with Purusha to produce worlds.

We can think of Purusha as multidimensional space and Prakriti as time. When they work together the creation and evolution of universe and visible world takes place. Sankhya philosophy also states that in the beginning three forces Sattvic, Rajas the Tamas were in equilibrium and when that was disturbed, they interacted with Prakriti to form worlds. Sankhya however is silent on what disturbed the equilibrium.

This is similar to what some of the modern scientists talk about the birth of universe. They say that in the beginning, time and multidimensional space were in equilibrium. The Universe came into being when that equilibrium was disturbed. Why that equilibrium was disturbed we do not know. Various theories abound like big bang, multiverse, brane world etc. but why the big bang took place nobody is sure.

A possible answer according to Sankhya could be that multidimensional space wanted to “become” or to experience! This space which is sometimes

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called Akash or God space by Adi Shankaracharya in his Vivek Chudamani or as Purusha in Sankhya philosophy, just wanted to experience [2]!

After the space-time equilibrium was disturbed, time came out and multidimensional space started flowing. This flow of space produced gravity and eddies which are the cause of visible matter and galaxies. Eddies are small vortex formed when anything flows. These are clearly seen in the flow of water in rivers and canals. In air they give rise to production of drag on airplane and sometimes produce bumpy rides. Formation of eddies is like a new structure being formed from the flowing material.

These space eddies apparently gave rise to the matter which formed the visible world. This is what scientists call as production of matter from vacuum. This interplay of time and multidimensional space giving rise to the visible world is similar to the interaction of Prakriti (time?) and Purusha (space?) as enunciated in Sankhya philosophy.

Eddy formation is a continuous process and with time more and more space is used up for these structures to form the visible world. The rest of the space still remains invisible and could be the basis of dark matter and dark energy that the physicists and astrophysics talk about.

This production of eddies and hence galaxies will keep on happening till the space is “exhausted” (though we do not know how much percentage of original space will that be) and then the reverse cycle of converting visible world to invisible “God space” will commence which will finally lead to time and space coming in equilibrium [3]. This is the eternal Brahmakala cycle at end of which all life is destroyed.

This exhaustion of space takes place since Purusha has experienced and has become satisfied. Similarly, Patanjali in his Yoga Sutras says that the cause of visible world is to satisfy the Universal consciousness!

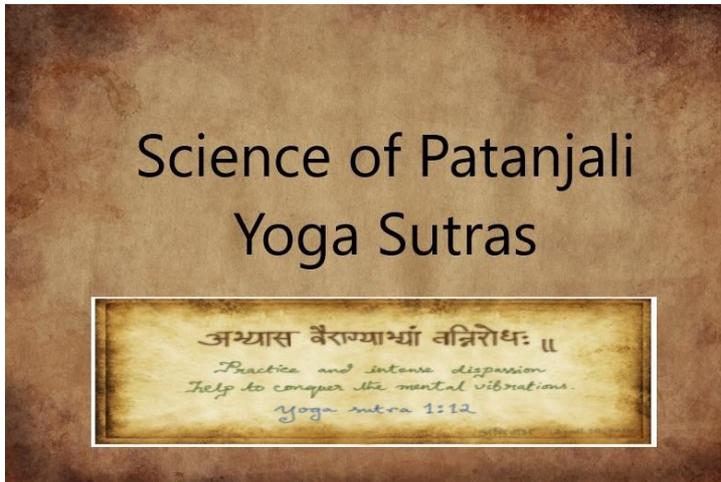
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The visible world seems like a crystallization of the higher dimensional space and is akin to the production of bubbles forming and dissolving on the surface of ocean – a constant example that Shri. Ramakrishna used to give when describing the formation of beings and worlds from Universal Consciousness.

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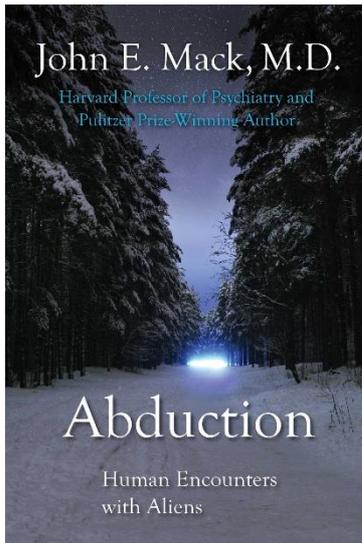
64. Was Sage Patanjali an Astronaut? - Science of Patanjali's Yoga sutras!



Patanjali Yoga Sutras are the origin of yoga. There are speculations that they were written about 2500 years ago [1]. The antecedents of its author Sage Patanjali such as who he was and where he lived, are also not known.

However, what we have today are his sutras which have been available to us in written form, for the last 300-400 years. To my mind the Yoga Sutras is the most scientific spiritual book ever written during ancient times and hence has relevance for today.

Patanjali in his Yoga Sutras has given a vivid description of the supernatural powers that a *Yogi* can obtain by doing *Sanyam* on various subjects and objects [2]. Patanjali defines *Sanyam* as a combination of *Dharan* (focus), *Dhyana* (contemplation) and *Samadhi* (total meditative absorption). When *Sanyam* is done on any subject for a long time then its complete knowledge results. Basically, the Sutras talk about how to develop the power for concentrating on a single thought for a very long time. The powers obtained via *Sanyam* includes levitation, mind reading, getting into another person's body, making oneself invisible, flying through air, etc., etc. All these powers are described in Section III (*Vibhuti Pada*) of the Yoga sutras.



In the seminal book on extra-terrestrial abductions of humans by inhabitants of Unidentified Flying Objects (UFOs), John Mack a professor of psychiatry at Harvard University has shown that all the persons abducted (abductees) and taken inside the spaceships talked about extra-terrestrials floating in the air; who could interact telepathically with them; read their minds and modify them; become invisible and exhibited almost all the supernatural powers written in the Patanjali Yoga Sutras [3,4]. Dr. Mack interviewed more than 300 abductees world over about their experiences and all of them talked about similar supernatural powers of extra-terrestrials.

Similar reporting was also done by Coral and Jim Lorenzen in their book “Encounters with UFO occupants” [5].

This similarity between powers written in Yoga Sutras and exhibited by extra-terrestrials is so uncanny that I sometimes think that Sage Patanjali could have been an extra-terrestrial being who came to earth almost 2500 years ago to give us this knowledge!

Thus I feel that if we understand the science of Yoga Sutras on how a *Yogi* can get these supernatural powers then it may also show us a way to understand the mind-matter interaction and probably pave the way for developing galactic travelling machines and technologies [6]. Thus, Yoga Sutras are very relevant for present times.

UFOs are real. There have been innumerable sightings and visitations by extra-terrestrials throughout the history of mankind. In Indian scriptures like Ramayana and Mahabharata there are quite a few descriptions of various gods visiting earth in their flying machines [7]. And recently US government has officially released video clippings of few of these sightings

[8]. Similarly, a 6-part docuseries released recently by Netflix has further shown the possibilities of these visitations and mankind's quest for understanding the technologies of UFO propulsion [9].

The propulsion technology used by UFOs effortlessly overcomes earth's gravitational pull and understanding this may help us produce unlimited renewable energies on this planet for our needs and benefit. Hence it is very necessary that we invest money and resources in discovering and understanding them.

Yoga Sutras of Patanjali

I feel there is tremendous amount of science embedded in these sutras and if studied properly with deep knowledge of modern science then they may reveal wonderful secrets of nature.

The book is divided into four sections with a total of 195 sutras. The sections are *Samadhi Pada* (51 sutras); *Sadhana Pada* (55 sutras); *Vibhuti Pada* (56 sutras) and the last section called *Kaivalya Pada* has 33 sutras.

The first two sections (*Samadhi* and *Sadhana*) talk about how to make the mind and body powerful enough so that one can focus on a single thought for a long time. This focus on a single thought leads to *Sanyam* (combination of focus, contemplation, and *Samadhi*). The state of *Samadhi* is reached when the object of focus vanishes, and one gets immersed in its essence.

The third section (*Vibhuti Pada*) is the main section of Yoga Sutras where the Science of Yoga is fully developed. In it Patanjali talks of using *Sanyam* on various parts of the body and on different subjects, to get supernatural powers and understanding the laws of nature and the Universe. It seems that some sutras are missing in this section since there is an abrupt change in the subject matter from one sutra to another.

And the last or the fourth section of the book (*Kaivalya*) talks about how using these powers and laws, a Yogi gains liberation from the cycle of birth and death. One of the most important tenets of Indian philosophical system is liberation of a soul from the cycle of birth and death and Patanjali shows very clearly how to achieve it. ***The above is the whole essence of the Yoga Sutras.***

It is also interesting to note that there is no reference to God in the Sutras but only to Universal consciousness (7 out of 195 sutras) [10]. Patanjali defines this Universal consciousness as an entity which is beyond space and time. *Thus, the sutras focus mostly on the science of mind control.*

Science of Yoga Sutras

I will now attempt to show the science embedded in some of the sutras. This is based upon my limited understanding of them and is speculative in nature. However, it shows that if we approach each sutra from a scientific point of view then its gems become evident.

In Section III. 53 of *Vibhuti Pada* Patanjali says, “By making *Sanyam* on a single moment and on the sequence of moments, a yogi gets *Vivek* (exalted knowledge) so that he/she can comprehend all objects in the universe simultaneously irrespective of their location and sequence of change”. Or in other words, the Mind of God!

And according to John A Wheeler – One of the world’s foremost experts on relativity, Einstein’s theory of gravitation can be simply stated as “Events and the interval between events build space-time” [11]. The geometric nature of space-time gives rise to gravity, tells the mass how to move, and is the basis of Universe and the movement of all heavenly bodies.

Again, in *Vibhuti Pada* (III. 31) Patanjali says that by doing *Sanyam* on the hollow of throat, one conquers hunger and thirst. Recently scientists have discovered that by stimulation of Vagus nerve, hunger pangs can be

suppressed. Vagus nerve is concentrated near the oesophagus tube – close to the hollow of throat. Few years ago U.S. Food and Drug Administration (US FDA) approved a device, which can electrically stimulate the Vagus nerve so that the brain gets the signal that stomach is full [12].

Similarly, Patanjali talks about doing *Sanyam* on relationship of body and space by which transport of body from one place to another takes place (III. 43). The abductees experience of getting their bodies transported from their home to the spacecraft mirrored the sutra where tunnelling and cellular transfer of the body took place [13].

In another sutra (III. 21) Patanjali says that doing *Sanyam* on body shape and its changes so that the reflected light does not reach the eyes of beholder, makes the body invisible. This process is used in stealth aircrafts where sharp angles and absorption of visible spectrum by the body makes it invisible [14].

And in sutra III. 35, Patanjali talks about doing *Sanyam* on heart gives complete knowledge of consciousness. Recent scientific discoveries have shown a close connection between the heart and mind [15].

Similarly, he talks about how a Yogi can read the other person's mind by doing *Sanyam* on his thought structure and also control it (III. 19) [16]. This is done presently through various process of Artificial Intelligence (AI) and hypnosis [17].

Patanjali also talks about how all the supernatural powers can come to a Yogi by taking drugs (IV. 1) ! Recent studies on the effect of recreational and mind-altering drugs like LSD etc. have shown enhanced spiritual experiences for drug takers and for some the experience of entity visitations [18]. To my mind this discussion on drugs is the first such anywhere in any ancient spiritual text.

It is really remarkable that Patanjali wrote about all these things almost 2500 years ago. Similarly, there are other sutras whose knowledge has been shown to be vindicated by the modern science. I think a whole book can be written about their relevance to science and technology. So, there is a need to study *Vibhuti pada* more thoroughly since many secrets in it still need to be rediscovered.

Yoga sutras are not an easy read. They are precise and crisp. India has had a long tradition of passing knowledge from guru to disciple through oral transmission. It is quite possible that when people did not understand the science behind these sutras some important sutras may have been lost. Thus, most of the times one needs to read between the lines with deep knowledge of modern science to fully appreciate their message.

Most commentaries on the Sutras in the past were written by people who did not understand science and hence there was a lot of confusion about their real meaning.

The comparison of Patanjali sutras with modern science is neither to belittle the latter nor to glorify our ancient tradition – both are important in their own way; but to show that all great knowledge originates from the same knowledge space irrespective of the person and the time of its discovery [19].

I have been inspired by Yoga Sutras and have been guided by the spirit of Patanjali in all my spiritual writings. His writings are like an infinite ocean. The more you read them the deeper is the knowledge. Consequently I have made a small attempt in trying to understand him through the publications of my two books; *Nature of Human Thought* and *Exploring the Mind of God* and this article is another attempt to show the science behind the sutras [20,21].

A half an hour video on this essay is available on YouTube [22].

This article was published in September 2021.



65. Nirvana is getting out of Earth's gravity field

Since time immemorial mankind has always dreamt of getting out of earth's gravity field and reaching the stars. In all cultures, gods have been depicted as shining beings descending from heaven in flying chariots and blazing machines. Even Shri Ramakrishna the Indian saint explained in great details how he and Swami Vivekananda came to earth from distant space [1].

Fascination with stars and space is somehow inbuilt in all of us. Astronauts who have gone in near-earth orbits and to the moon have always spoken about it as a spiritual experience. The space travel invariably changes them and has a profound positive impact on their thinking.

Part of the reason for our fascination with space and stars could be that some of our ancestors might have come from distant planets and hence it is somehow embedded in our genetic code [2]. Another reason is that as our technology develops there is a desire to expand our horizons and vision field and maximize our experience and space travel is the next frontier (Theme section of the book Exploring the Mind of God [3]).

Yet another reason could be the desire to get away from the pains and miseries of this planet earth and go to other habitable planets which may provide better place to live. This could be the basis of concept of heaven preached in almost all religions.

Thus leaving the gravity field of earth and flying into intergalactic space is somehow deeply ingrained in our brains.

But this travel requires huge amount of energy and resources and with the present level of our technology we have only been able to go into near-earth orbits and few times to the moon and Mars. Till we have a major

breakthrough in jet propulsion technology and materials, we will remain earth-bound.

Nevertheless there is enough documentary evidence that we are continuously visited by spaceships (UFOs) from distant planets. Obviously these advanced technological societies have mastered the science and art of intergalactic travel. Eventually as we make advancements in science and technology we will also become a space-seeking civilization.

However a simpler and energy wise cheaper method than spaceship travel is to go via the soul route! Advanced yogis have claimed that by willing one's death, one can use the gravity of sun and moon to help the transmigration of soul to other worlds. For example Bhishma Pitamah in Mahabharata stayed on the prickly arrow cot for about six months before he left his body by will at winter solstice - the time when earth is closest to the sun [4]. Similarly Swami Vivekanand studied the almanac thoroughly before deciding when to leave his body [5]. They obviously understood the effect of gravity on human thought and memory (soul).

Still others have written about space travel during out of body experience (OBE). Carl Jung - the famous psychologist had an OBE in which he travelled to outer space [6]. His experience and vision of earth as seen from space and written in early 1940s tallied very closely with what the astronauts reported in late 1960s. Nevertheless OBE space travel is transitory in nature and lasts for few hours.

So how is it possible to will one's soul out of the gravity field of earth? Quantum mechanics might provide a possible explanation.

Tunnelling

In quantum mechanics there is a phenomenon called tunnelling which says that there exists a very small probability that a tennis ball can tunnel or pass through a thick brick wall [7]. Normally we do not see such a

phenomenon because of the mass of the ball and hence the probability is extremely small. *But it still exists.*

In fact, the probability of passing (or tunnelling as it is called) of a ball or an object is inversely proportional to the square root of mass of the particle and the drag by the environment on it (in this example it is the brick wall). Hence the smaller the mass and drag on it is, the greater is the probability of it's tunnelling through a barrier.

Thus a small particle like an electron can easily tunnel through the wall as compared to the tennis ball. This tunnelling effect is not science fiction and is used quite regularly in the design of various electronic devices and circuits.

If we extend this analogy to soul then we can speculate that it can tunnel through the earth's gravity field provided its mass is very small. This can happen when it sheds all the extraneous memories and becomes a pure thought. Or as Patanjali in his Yoga sutras says, "When *sanskars* (memories) or *gunas* cease to mutate, the pure Atman remains and ultimate liberation takes place". This must be the critical mass for tunnelling and the ultimate liberation is to get out of the birth/death cycle on this planet earth.

The soul in this state can be speculated to retain the very basic information [8]. It is like the password and name ID. It can go to any planet or galaxy for rebirth and access its past information from knowledge space [9].

Another interesting aspect of quantum tunnelling is that it is independent of force or energy of electron but only depends upon the mass of particle and drag encountered or the "thickness" of the drag wall. Thus a pure soul (Atman) can tunnel through the drag of gravity field and spirit world which is made up of memories of departed souls [10].

Hence if we want to leave the gravity field, then we should try to remove the extraneous memories (equivalent to mass) attached to the pure thought and that is the whole basis of Yoga. ***I feel that the whole basis of liberation in Indian yogic system is to get away from the gravity field of earth!***

This is easier said than done. After all, at the time of death, the life-long memories are difficult to forget and the soul clings to the body [11]. Nevertheless if we follow the teachings of Gita then all our actions should be done in the spirit of Karma with no attachment to them. If practiced continuously for a long time this detachment to the rewards of action may allow us to reduce the mass at the time of death and ultimately get out of the gravity field.

Similarly following Patanjali method of practicing *Sanyam* can also help remove these memories and reduce the mass [12].

Alternatively, we can all work together to make this earth a very nice and hospitable place to live where the lives of all its inhabitants are emotionally satisfying and sustainable [13]. Then this planet earth will become heaven that we all dream to reach after death. So, when we are born time and again on this planet then we will not have to spend energy and effort to get out of its gravity field.

This article was published in May 2012.



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