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**Spiritual Map of India*

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Editorial

“The work of India’s regeneration must be a root and branch reform said” Swami Vivekananda. “To the reformers I will point out that I am a greater reformer than any one of them. They want to reform only little bits. I want root-and-branch reform.” (*The Complete Works of Swami Vivekananda/ Volume 3*) What is meant by that? He said the reformers try to change some customs, discard outdated forms, hammer out few social laws, and suggest some alternate systems, codes, names. But Time proves ruthlessly that all of these are errors or are at the most temporary solutions. Mostly the same problems continue with some ornamental changes. A generation fights for some ideal and the next generation throws that away as if it is something superfluous if not a disgusting blunder. May be that is the whole issue with most of the mankind. Look at our Educational, Political, Economic, Medicinal, and other systems today!! Even when we know something is wrong, must be discarded, and sincerely want to replace that something, we are not able to come out of the shadow of those very moulds which we are trying to replace. For our thinking is still in the grip of the same old cliché, formulae, same paradigm.

Why does this happen? The moulds or the forms are only expressions of the rhythm, of idea and that in turn is expression of the soul within. It is imperative to create, and not import or impose, new forms in tune with the idea which is central to our being, and ensure that the new form is also an organic manifestation from the same soul.

Last 500 years or so, mankind has been bulldozed by the reductionist, Cartesian, materialist, homocentric or rather Eurocentric ideals and so the forms they globalized have been mechanistic and dehumanising to say the least. The colonizers succeeded not just in enslaving our bodies but also in enslaving our minds. So even when we tried to remove their yoke, did reforms or brought alternates, they are still not expressions of our innate self of India’s soul.

Sri Aurobindo said that ‘The work of renaissance is to make this spirit, the higher view of life once again the creative and dominant power in the world. But at present it is half awakened and most of the action is under the European impress and because it is foreign to the spirit within so the action is poor in will, feeble in form and ineffective in results. The action must come from the roots with a greater light and be more generalised to make renaissance possible not only in prospect but also in fact.’ (Sri Aurobindo, *The Renaissance in India*)

Evolution and not revolution is the law of Nature and India has understood it better than many others. Our root, our central conception, the master key is Spirituality. So before making any social, political, educational, economic reforms, flood the land with the fresh outburst of spirituality, let the land of dharma and shastra get deluged again with the nectar of the wisdom which was uttered by Vedic and Upanishadic seers. For that was the luminous seed from which grew all the later expressions of Indian culture.

There is thus the pressing need to trace, express and then impress upon all the study of India’s cultural history with the evolution of consciousness as the central theme. The amazing creativity, vitality, intellectuality and continuity, so vividly visible among all possible expressions of human soul throughout the cultural history of India, must be seen and then is to be understood in the light of Sri Aurobindo and some other seers and thinkers. The ideas and research methodology of the project India on the March (IOM) by Sri Aurobindo Centre for Advanced Research is conceived, taught and is being operationalized with that aim. This issue of IOM e-journal is put together with some very relevant themes and thoughts in that pursuit.

Narendra Joshi

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INDIA ON THE MARCH

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Immortal Wisdom



Verses from the Upanishads

The Kena Upanishad

First Part

By whom missioned falls the mind shot to its mark? By whom yoked moves the first life-breath forward on its paths? By whom impelled is this word that men speak? What god set eye and ear to their workings?

1. That which is hearing of our hearing, mind of our mind, speech of our speech, that too is life of our life-breath and sight of our sight. The wise are released beyond and they pass from this world and become immortal.

2. There sight travels not, nor speech, nor the mind. We know It not nor can distinguish how one should teach of It: for It is other than the known; It is there above the unknown. It is so we have heard from men of old who declared That to our understanding.

3. That which is unexpressed by the word, that by which the word is expressed, know That to be the Brahman and not this which men follow after here.

4. That which thinks not by the mind,¹ that by which the mind is thought, know That to be the Brahman and not this which men follow after here. That which sees not with the eye², that by which one sees the eye's seeings, know That to be the Brahman and not this which men follow after here.

5. That which hears not with the ear,³ that by which the ear's hearing is heard, know That to be the Brahman and not this which men follow after here.

6. That which breathes not with the breath,⁴ that by which the life-breath is led forward in its paths, know That to be the Brahman and not this which men follow after here.

Second Part

1. If thou thinkest that thou knowest It well, little indeed dost thou know the form of the Brahman. That of It which is thou, that of It which is in the gods, this thou hast to think out. I think It known.

2. I think not that I know It well and yet I know that It is not unknown to me. He of us who knows It, knows That; he knows that It is not unknown to him.

3. He by whom It is not thought out, has the thought of It; hereby whom It is thought out, knows It not. It is unknown to the discernment of those who discern of It, by those who seek not to discern of It, It is discerned.

4. When It is known by perception that reflects It, then one has the thought of It, for one finds immortality; by the self one finds the force to attain and by the knowledge one finds immortality. If here one comes to that knowledge, the none truly is; if here one comes not to the knowledge, then great is the perdition.

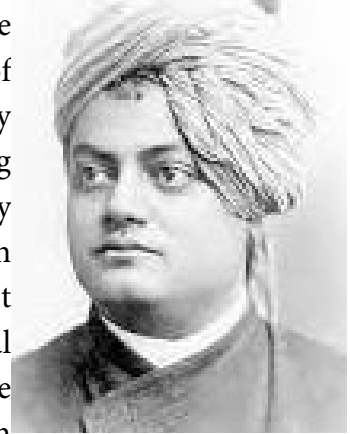
The wise distinguish That in all kinds of becomings and they pass forward from this world and become immortal.

(Sri Aurobindo's Translation)

The Future of India

Swami Vivekananda

This is the ancient land where wisdom made its home before it went into any other country, the same India whose influx of spirituality is represented, as it were, on the material plane, by rolling rivers like oceans, where the eternal Himalayas, rising tier above tier with their snowcaps, look as it were into the very mysteries of heaven. Here is the same India whose soil has been trodden by the feet of the greatest sages that ever lived. Here first sprang up inquiries into the nature of man and into the internal world. Here first arose the doctrines of the immortality of the soul, the existence of a supervising God, an immanent God in



nature and in man, and here the highest ideals of religion and philosophy have attained their culminating points. This is the land from whence, like the tidal waves, spirituality and philosophy have again and again rushed out and deluged the world, and this is the land from whence once more such tides must proceed in order to bring life and vigour into the decaying races of mankind. It is the same India which has withstood the shocks of centuries, of hundreds of foreign invasions of hundreds of upheavals of manners and customs. It is the same land which stands firmer than any rock in the world, with its undying vigour, indestructible life. Its life is of the same nature as the soul, without beginning and without end, immortal; and we are the children of such a country.

Children of India, I am here to speak to you today about some practical things, and my object in reminding you about the glories of the past is simply this. Many times have I been told that looking into the past only degenerates and leads to nothing, and that we should look to the future. That is true. But out of the past is built the future. Look back, therefore, as far as you can, drink deep of the eternal fountains that are behind, and after that, look forward, march forward and make India brighter, greater, much higher than she ever was. Our ancestors were great. We must first recall that. We must learn the elements of our being, the blood that courses in our veins; we must have faith in that blood and what it did in the past; and out of that faith and consciousness of past greatness, we must build an India yet greater than what she has been. There have been periods of decay and degradation. I do not attach much importance to them; we all know that. Such periods have been necessary. A mighty tree produces a beautiful ripe fruit. That fruit falls on the ground, it decays and rots, and out of that decay springs the root and the future tree, perhaps mightier than the first one. This period of decay through which we have passed was all the more necessary. Out of this decay is coming the India of the future; it is sprouting, its first leaves are already out; and a mighty, gigantic tree, the Urdhvamula, is here, already beginning to appear; and it is about that that I am going to speak to you.

The problems in India are more complicated, more momentous, than the problems in any other country. Race, religion, language, government — all these together make a nation. The elements which compose the nations of the world are indeed very few, taking

race after race, compared to this country. Here have been the Aryan, the Dravidian, the Tartar, the Turk, the Mogul, the European — all the nations of the world, as it were, pouring their blood into this land. Of languages the most wonderful conglomeration is here; of manners and customs there is more difference between two Indian races than between the European and the Eastern races.

The one common ground that we have is our sacred tradition, our religion. That is the only common ground, and upon that we shall have to build. In Europe, political ideas form the national unity. In Asia, religious ideals form the national unity. The unity in religion, therefore, is absolutely necessary as the first condition of the future of India. There must be the recognition of one religion throughout the length and breadth of this land. What do I mean by one religion? Not in the sense of one religion as held among the Christians, or the Mohammedans, or the Buddhists. We know that our religion has certain common grounds, common to all our sects, however varying their conclusions may be, however different their claims may be. So there are certain common grounds; and within their limitation this religion of ours admits of a marvellous variation, an infinite amount of liberty to think and live our own lives. We all know that, at least those of us who have thought; and what we want is to bring out these lifegiving common principles of our religion, and let every man, woman, and child, throughout the length and breadth of this country, understand them, know them, and try to bring them out in their lives. This is the first step; and, therefore, it has to be taken.

We see how in Asia, and especially in India, race difficulties, linguistic difficulties, social difficulties, national difficulties, all melt away before this unifying power of religion. We know that to the Indian mind there is nothing higher than religious ideals, that this is the keynote of Indian life, and we can only work in the line of least resistance. It is not only true that the ideal of religion is the highest ideal; in the case of India it is the only possible means of work; work in any other line, without first strengthening this, would be disastrous. Therefore the first plank in the making of a future India, the first step that is to be hewn out of that rock of ages, is this unification of religion.

...My idea is first of all to bring out the gems of spirituality that are stored up in our books and in the possession of a few only, hidden, as it were, in monasteries and in forests — to bring them out; to bring the knowledge out of them, not only from the hands where it is hidden, but from the still more inaccessible chest, the language in which it is preserved, the incrustation of centuries of Sanskrit words. In one word, I want to make them popular. I want to bring out these ideas and let them be the common property of all, of every man in India, whether he knows the Sanskrit language or not.

We must have a hold on the spiritual and secular education of the nation. Do you understand that? You must dream it, you must talk it, you must think it and you must work it out. Till then there is no salvation for the race. The education that you are getting now has some good points, but it has a tremendous disadvantage which is so great that the good things are all weighed down. In the first place it is not a man-making education,

it is merely and entirely a negative education. A negative education or any training that is based on negation, is worse than death. ...Education is not the amount of information that is put into your brain and runs riot there, undigested, all your life. We must have life-building, man-making, character-making assimilation of ideas. If you have assimilated five ideas and made them your life and character, you have more education than any man who has got by heart a whole library यथा खर चन्दनभारवाही भारस्य वेत्ता न तु चन्दनस्य ।— “The ass carrying its load of sandalwood knows only the weight and not the value of the sandalwood.” If education is identical with information, the libraries are the greatest sages in the world, and encyclopaedias are the Rishis. The ideal, therefore, is that we must have the whole education of our country, spiritual and secular, in our own hands, and it must be on national lines, through national methods as far as practical.

Each one of you has a glorious future if you dare believe me. Have a tremendous faith in yourselves, like the faith I had when I was a child, and which I am working out now. Have that faith, each one of you, in yourself — that eternal power is lodged in every soul — and you will revive the whole of India. Ay, we will then go to every country under the sun, and our ideas will before long be a component of the many forces that are working to make up every nation in the world. We must enter into the life of every race in India and abroad; shall have to work to bring this about. Now for that, I want young men. “It is the young, the strong, and healthy, of sharp intellect that will reach the Lord”, say the Vedas. This is the time to decide your future — while you possess the energy of youth, not when you are worn out and jaded, but in the freshness and vigour of youth. Work — this is the time; for the freshest, the untouched, and unsmelled flowers alone are to be laid at the feet of the Lord, and such He receives. Rouse yourselves, therefore, or life is short. There are greater works to be done than aspiring to become lawyers and picking quarrels and such things. A far greater work is this sacrifice of yourselves for the benefit of your race, for the welfare of humanity. What is in this life? You are Hindus, and there is the instinctive belief in you that life is eternal. Sometimes I have young men come and talk to me about atheism; I do not believe a Hindu can become an atheist. He may read European books, and persuade himself he is a materialist, but it is only for a time. It is not in your blood. You cannot believe what is not in your constitution; it would be a hopeless task for you. Do not attempt that sort of thing. I once attempted it when I was a boy, but it could not be. Life is short, but the soul is immortal and eternal, and one thing being certain, death, let us therefore take up a great ideal and give up our whole life to it. Let this be our determination, and may He, the Lord, who “comes again and again for the salvation of His own people”, to quote from our scriptures — may the great Krishna bless us and lead us all to the fulfilment of our aims!

--Excerpt from Swami Vivekananda's writing on India

(https://www.ramakrishnavivekananda.info/vivekananda/volume_3/lectures_from_colombo_to_almora/the_future_of_india.htm)

A Talk Based on the Five Dreams of Sri Aurobindo

V. Ananda Reddy

(Click to watch full talk: <https://www.youtube.com/watch?v=MVS6JYZ7bmY>
Text used for the talk is given below)



First Dream

The first of these dreams was a revolutionary movement which would create a free and united India. India today is free but she has not achieved unity. (CWSA 36: 478)

But the old communal division into Hindus and Muslims seems now to have hardened into a permanent political division of the country. It is to be hoped that this settled fact will not be accepted as settled for ever or as anything more than a temporary expedient. For if it lasts, India may be seriously weakened, even crippled: civil strife may remain always possible, possible even a new invasion and foreign conquest.

But by whatever means, in whatever way, the division must go; unity must and will be achieved, for it is necessary for the greatness of India's future. (Ibid 478-79)

...because in the next great stage of human progress it is not a material but a spiritual, moral and psychical advance that has to be made and for this a free Asia and in Asia a free India must take the lead, and Liberty is therefore worth striving for for the world's sake. (CWSA 7: 572)



Second Dream

Another dream was for the resurgence and liberation of the peoples of Asia and her return to her great role in the progress of human civilisation. Asia has arisen; large parts are now quite free or are at this moment being liberated: (CWSA 36: 479)



The awakening of Asia is the fact of the twentieth century, and in that awakening the lead has been given to the Mongolian races of the Far East. In the genius, the patriotic spirit, the quick imitative faculty of Japan; in the grand deliberation, the patient thoroughness, the irresistible organization of China... (CWSA 7: 989)

The vision of a China organized, equipped, full of the clang of war and the tramp of armed men, preparing to surge forth westwards is the nightmare of their dreams. (Ibid: 989)

And another terror of economic invasion, of the Mongol swamping Europe with cheap labour and stifling the industries of Europe adds a fresh poignancy to the apprehensions which convulse the West. (Ibid: 989)

Hence the panic in America, in Australia, in Africa, the savage haste to expel the Asiatic at any cost before the military strength of China is sufficiently developed to demand entrance for her subjects with the sword emphasizing her demand. (Ibid: 989)

This is the Yellow Peril, and every European knows in his heart of hearts that it is only a question of the time necessary for his vision to translate itself into the waking world. (Ibid: 989-90)



Third Dream

The third dream was a world-union forming the outer basis of a fairer, brighter and nobler life for all mankind. That unification of the human world is under way; there is an imperfect initiation organised but struggling against tremendous difficulties. (CWSA 36: 479)



A catastrophe may intervene and interrupt or destroy what is being done, but even then the final result is sure. For unification is a necessity of Nature, an inevitable movement. Its necessity for the nations is also clear, for without it the freedom of the small nations may be at any moment in peril and the life even of the large and powerful nations insecure. (Ibid: 479-80)

A new spirit of oneness will take hold of the human race. (Ibid: 480)



Fourth Dream

Another dream, the spiritual gift of India to the world has already begun. (Ibid: 480)

We are Hindus and naturally spiritual in our temperament, because the work which we have to do for humanity is a work which no other nation can accomplish, the spiritualisation of the race; so the men whom we worship are those who have helped the spiritual progress of mankind. (CWSA 7: 977)



This is the reason of India's resurgence, this is why God has breathed life into her once more, why great souls are at work to bring about her salvation, why a sudden change is coming over the hearts of her sons. The movement of which the first outbreak was political, will end in a spiritual consummation. (Ibid: 979)



Fifth Dream

The final dream was a step in evolution which would raise man to a higher and larger consciousness and begin the solution of the problems which have perplexed and vexed him since he first began to think and to dream of individual perfection and a perfect society. This is still a personal hope and an idea, an ideal which has begun to take hold both in India and in the West on forward-looking minds. (CWSA 36: 480)

I have never had a strong and persistent will for anything to happen in the world — I am not speaking of personal things — which did not eventually happen even after delay, defeat or even disaster. (CWSA 35: 208)



Aryabhata: Some Historical Perspectives

Amartya Kumar Dutta

It is unfortunate that science students in India, by and large, do not have even a fraction of the awareness about ancient Indian scientists, as they have regarding Indian literary figures or ancient European scientists of comparable stature. Thus, although there are plenty of articles on Aryabhata, their contents have remained confined to research journals and scholarly texts without percolating into the general cultural consciousness.

In this series we shall try to convey to the young readers some idea about the life and times of Aryabhata, his greatness as a scientist and the historical role of his famous treatise *Aryabhatiya*. The original verses of *Aryabhatiya* are given in ([1]). It would not be possible to make a serious analysis of the entire range of his astronomical work in a few pages. Instead we shall make a small beginning : we shall highlight, in this issue, one important contribution of Aryabhata which involves the least technical background in astronomy. We hope that this preliminary exposure will encourage youngsters to acquire some general knowledge of astronomy which will enable them to make a deeper study of Aryabhata's work using existing literatures and their own independent judgements.

In the October 2002 issue, we had discussed the *kuttaka* method, pioneered by Aryabhata, for solving the linear Diophantine equation. In the next instalment we shall mention some of the other results from Aryabhata's mathematics. Later, we shall resume the series on Indian works in Diophantine equations.

Introduction

Ancient India had a rich tradition in astronomy - a substantial portion of the mathematical investigations in India arose from the demands of astronomy. The Vedic Samhitas, Brahmanas, Aranyakas and Upanishads reveal considerable astronomical knowledge. The oldest available treatise in India devoted exclusively to astronomy is the *Vedanga Jyotisha* (c.1400 BC vide [1], [2]) of sage Lagadha, composed during the later Vedic age, recording the accumulated knowledge of the preceding millennia. In the next phase of Indian astronomy, there were several texts known as the *Siddhantas* ("established theories") most of which are now lost. Only five *Siddhantas* have survived through the compilation *Pancasiddhantika* by Varahamihira (505 AD). For more details, see [2], [3] or [4].

Aryabhata (b.476 AD) is the first known astronomer in post-Vedic India whose work has been found till date. Even his famous work *Aryabhatiya* ("a composition of Aryabhata") remained untraced for a long time, though its existence had been known through the numerous commentaries on it. As late as in 1817, Colebrooke had lamented ([5], p 422) : "A long and diligent research in various parts of India, has, however, failed of recovering any part of the *Padmanabha vija* (or Algebra of Padmanabha), and of the algebraic and other works of Aryabhata."¹ Fortunately, *Aryabhatiya* was recovered in 1864 by Bhau Daji

(though the works of Padmanabha remain elusive) and published in 1874 by H. Kern. The text consists of 121 verses divided into four sections (called pada): Gitika (13 verses), Ganita or mathematics (33 verses), Kalakriya or reckoning of time (25 verses) and Gola or celestial sphere (50 verses). Another work Aryabhata Siddhanta² remains lost and is known only through quotations from later astronomers.

Impact of Aryabhatiya

Aryabhata is believed to have triggered the scientific and mathematical renaissance in India during the “classical age” of Indian history. With the passage of time, much of the valuable knowledge of the preceding era was getting distorted or lost. Aryabhata revived and, through his concise text, preserved, some of the best achievements in astronomy and mathematics up to his time. As the author remarks towards the end of the Aryabhatiya (Gola; 49) : “By the Grace of Brahma, the precious jewel of true knowledge, which lay sunk so long in the ocean of true and false knowledge, has been brought out by me aided by the boat of my intellect”.

The Aryabhata marked the beginning of a new phase in Indian astronomy and mathematics. Its impact can be felt from the enormous output of commentaries (bhasya) and expositions on the work for more than 1000 years. In fact, there is hardly any subsequent astronomy text in ancient India which does not refer to Aryabhata. There emerged, what is known as, the Aryabhata school of astronomy represented by stalwarts like Prabhakara, Bhaskara I, Govindaswami, Haridatta. Vatesvara, and a long line of illustrious Kerala astronomers.³

While Aryabhata fulfilled a great role in imparting a new direction and infusing a new life in the study of astronomy and mathematics, and while the Aryabhatiya is also valuable as a record of the state of knowledge around 500 AD, the impact of Aryabhatiya, ironically, had one disastrous consequence for the modern historian : in course of time, the study of the earlier astronomy texts got abandoned and, inevitably, these texts got lost. As a result, there is now very little of solid material from which the history of Indian astronomy during the long period between the Vedanga-Jyotisha and Aryabhatiya can be reconstructed.⁴ At present, there are still 100000 manuscripts on jyotisha (astronomy) that have survived ([7], p 321-322) - a small percentage of what was once written. But almost all these extant texts were composed after the time of Aryabhata.

Commentaries

Aryabhatiya is oppressively terse, often incomprehensible. Conciseness in expression, especially in scientific matters, was highly valued in ancient India. It ensured the preservation of a portion of the knowledge for posterity through transmission by memory. Besides, this culture of brevity must have contributed to the sustained creativity. For, it is the experience of all modern researchers that one eventually gains more insight into a subject from a terse text rather than from a clearly spelt-out elaborate text. But even by ancient Indian standards, Aryabhatiya is extremely condensed.⁵ As in the case of the kuttaka, it is often through the

commentaries by subsequent writers that a modern researcher is able to interpret the full implications of certain verses.

Among the renowned astronomers who wrote commentaries on the Aryabhata, special mention may be made of Bhaskara I (6th century AD), Suryadeva (b. 1191 AD), Paramesvara (b. 1360 AD) and Nilakantha (b. 1444 AD).

The oldest available commentary is the Aryabhatiyabhasya of Bhaskara I. He also wrote two other astronomy texts: the Mahabhaskariya, an elaborate exposition of Aryabhata's ideas, and the Laghubhaskariya which was a systematic abridged version of Mahabhaskariya. These three treatises were valued as works of great scholarship and the author was regarded as sarvajna bhasyakara (all knowing commentator). Commentaries were written by reputed astronomers on Bhaskara I's texts - several are extant. The wide popularity of Bhaskara's works, especially in South India, contributed significantly in spreading the fame and ideas of Aryabhata. But while historians are indebted to him for elucidation of Aryabhata's verses, Bhaskara I himself says: "These aphorisms written by Aryabhata deal with matters beyond the reach of the senses. It is impossible for people like us to explain even one-hundredth part of their meaning, not to say of the whole."

Maha-bhasya, the commentary by Nilakantha, is also regarded as a valuable masterpiece for its clear exposition on many cryptic verses of Aryabhata as also for the wealth of historical information regarding Indian astronomy including quotations from several astronomers (some of whose works are no longer available).

Aryabhata was translated into Arabic under the title Zij al-Arjabhar towards the end of the 8th century. Later, when the Arabic texts were being translated into Latin from around the 13th century, some of his ideas got transmitted to modern Europe.

The Life and Times of Aryabhata

Practically nothing is known about the personal or academic life of Aryabhata except for a few fragmentary pieces of information that could be inferred from his verses in Aryabhata.

From the statement (Kalakriya; 10) that 3600 years of Kaliyuga⁶ had elapsed when the author was 23 years old, it is inferred that Aryabhata was born in 476 AD. It is generally presumed that the text was composed in 499 AD; some astronomers like R. Billard ([8]) feel that the text was composed around 510 AD.

From another statement (Ganita; 1) "...Aryabhata sets forth here the knowledge honoured at Kusumapura" and the identification of Kusumapura with Pataliputra (near modern Patna) by Bhaskara I, it appears that Aryabhata lived at this historic city in ancient Magadha (modern Bihar) which used to be a flourishing seat of learning at that time. It is speculated that he was among the luminaries at the University of Nalanda.

Aryabhata thus lived during the later Gupta period - the Gupta king Buddhagupta reigned at Pataliputra during 476-496 AD. The Gupta period, called "The Golden Age" in the cultural and social history of India, had witnessed a magnificent efflorescence in

philosophy, literature, science, art and architecture, and in the evolution of a vigorous and complex society. But even in this age of a high outburst of intellectual activity, creative efforts had the touch of a spiritual inspiration or motive. Aryabhata begins his treatise with an Invocation (Gitika; 1): “Having paid obeisance to the Supreme Brahman - the One [in Himself] and Many [in Manifestation], the True Divine Principle - Aryabhata describes the three topics: mathematics, reckoning of time and celestial sphere He concludes the text with an acknowledgement of His Grace for successful completion of the work. The concluding verse of the Gitika pada suggests that astronomy and mathematics were to be mastered for a complete understanding of the universe and that a perfect knowledge of it would help in the attainment of the Supreme Realisation.

Aryabhata The Experimental Scientist

Recent findings confirm that Aryabhata, like several other ancient Indian astronomers, was a meticulous observer and experimenter and that the *Aryabhatiya* is an astronomical work of great perfection. Through computer studies and statistical analyses, the French astronomer Roger Billard has demonstrated ([8]) that the constants and parameters of Aryabhata’s system were determined on the basis of very accurate observations made in India around 510 AD.⁷ Aryabhata’s record of the positions of the planets in his time are in very good agreement with modern calculations of the same. To quote Billard ([8], p 83): “One cannot fail to notice the astonishing precision of these mean positions as a whole during the period of their observations. This precision certainly represented the limit of accuracy of ancient astronomical methods, of the instruments in use, and of the mathematical models then available.”

Aryabhata briefly hinted a method for making a simple instrument for astronomical observations (Gola; 22): “A globe of wood, perfectly spherical, uniformly dense, but light in weight, should be constructed. It should be made to rotate, keeping the required pace with time, with the help of mercury, oil and water, by the application of one’s intelligence.”

A more detailed description of this water-clock is given in the commentary by Suryadeva - see ([1], p 129-130). The (lost) *Aryabhata Siddhanta* was famous for its description of astronomical instruments especially the water-clocks. Fortunately, quotations from this work regarding water-clock and other instruments occur in the extant works of Ramakrishna Aradhya (1472 AD) and Tamma Yajva (1599 AD) - see ([10]) for more details.

The ancient Indian writers on astronomy are generally silent regarding the principles adopted in deriving the mean motions of the planets.⁸ But it is the notoriously concise Aryabhata who has left, in a single stanza (Gola; 48), at least some clue regarding the methods : “The sun has been determined from the conjunction of the earth and the sun; the moon from the conjunction of the sun and the moon; and the planets from the conjunctions of the planets and the moon Referring to this verse, the great astronomer Nilakantha wrote ([3], p 87): “The principles have all been implied in [the words quoted above]. Employing the principles implied here, it is possible for the intelligent to conduct the experiments, duly.”

From time to time, ancient Indian astronomers used to revise and modify the existing

parameters taking into account the updated data obtained from fresh observations and utilising the refinements in computational techniques brought about by progressive advancements in mathematical knowledge. Aryabhata was probably a tirthankara in inculcating this culture of samskara (reform). The radical changes that he made in prevailing astronomical systems ensured for him a special place in the Indian psyche, as is reflected in the ancient eulogy: “ When the methods of the five Siddhantas began to yield results conflicting with observed phenomena, such as the settings of the planets, the eclipses, etc, there appeared in the Kali age, at Kusumapura, Surya himself in the guise of Aryabhata, the Kulapa, who was well-versed in astronomy. Subsequent Indian astronomers continued to perform continuous and careful experimentations and amendments. In the very next century (after Aryabhata), Brahrnagupta was to introduce improvements over Aryabhata’s constants ! A special mention has to be made of Paramesvara’s meticulous recordings of the lunar and solar eclipses over a period of 55 years.

Nilakantha expressed profound admiration for Aryabhata for his insistence on periodic observations. He remarked ([3], p 87): “...Aryabhata has composed his Siddhanta only to exemplify the methods of experimentation and expound the corpus of principles necessary therefore” Nilakantha himself embodied this spirit emphasising the importance of astronomical observations, especially during eclipses. He insisted ([3], p 87) that such “experimentation should continue to be done by successive generation of disciples and grand disciples. In the face of such plain facts, should we dogmatically continue to cling to the myth that ancient Indian culture has led the nation away from a scientific study of nature and that its thinkers and scholars were capable only of unsubstantial metaphysics ?

Axial Rotation of Earth

The great discovery that the earth rotates around its own axis from west to east is recorded in the Aryabhatiya (Gitika 3,4,6; Kalakriya 5; Gola 9,10). The young astronomer boldly declared that the apparent motion of the heavenly bodies round the earth is only an illusion and explained it beautifully with a similitude (Gola 9) : “ Just as a man in a boat, moving forward, sees the stationary objects (on either side of the river) as moving backward, so are the stationary stars seen by the people at Lanka⁹ as moving exactly towards the west” A thousand years later, Copernicus was to systematically expound the principle of relativity of motion that is explained here.

Period of Axial Rotation -The Sidereal Day

In the very first statement on astronomy in Aryabhatiya (Gitika; 3), Aryabhata mentions: “In a yuga, the eastward revolutions of the sun are 4320000; of the earth, 1582237500; ...” He also stated (Kalakriya 5) that “The rotations of earth are sidereal 10 days. Thus, according to Aryabhata, the number of rotations of the earth (i.e., the number of sidereal¹⁰ days) in 4320000 sidereal solar years is 1582237500. It follows that the number of mean solar days in that period = $1582237500 - 4320000 = 1577917500$. Therefore, in Aryabhata’s theory, the period of rotation of earth (equivalently the duration of a sidereal day) is $1577917500/1582237500 \times 24$ hours, which works out to be 23 hours 56 minutes 4.1

seconds (as the reader can easily verify). Given that the modern value is 23 hours 56 minutes 4.091 seconds, is not Aryabhata's accuracy here truly remarkable ?

Note that, by Aabhatiya, a sidereal solar year consists of $1577917500/4320000$ (= $365\ 1175/43200$) mean solar days which is exactly 365 days 6 hours 12 minutes 30 seconds.¹¹ In terms of decimal fractions, Aryabhata's estimate of the duration of a sidereal solar year, upto 5 decimal places, becomes 365.25868 days. The modern estimate is 365.25636 whereas Ptolemy's value was 365.24666 (see [1], P 7).

How did Aryabhata arrive at the estimate of 1582237500 rotations in 4320000 years? The only-clue is the verse Gola 48: "The sun has been determined from the conjunction of the earth and the sun... \ The phrase "the conjunction of the earth and the sun" possibly refers to the number of sunrises in a sidereal solar year. Thus, very probably, Aryabhata first made an estimate of the number of mean solar days in a sidereal solar year, arrived at an estimate equivalent to , whence he got the integer $432000 + 4320000 =$ 1582237500.

The duration of the sidereal solar year was probably determined by a careful recording of the angular distances of the sun from some bright star at intervals of 365 and 366 days. This distance was possibly computed by observing the time that elapsed between the risings (or settings) of a bright star and the sun. As the length of a solar day is not constant, the determination of the sidereal year in terms of mean solar days would have required observations over a long period of time.

Yuga

The Vedanga Jyotisha conceived of a cycle of 5 years called the yuga. But a peculiar feature of the subsequent phases of Indian astronomy has been the adoption of the Puranic cycle of 4320000 years called mahayuga or chaturyuga - sometimes abbreviated as yuga. Such large periods - with their nthological associations - have often misled modern readers into an impression that ancient Indian astronomy was not science but imagination. Thus, at first glance, Aryabhata's assertion of "1582237500 rotations of earth in a yuga" tends to create a mental block. But, as we have seen, it is equivalent to a modern statement: "The period of rotation of earth is 23h 56m 4.1s" - which is astonishingly accurate! As a well-known astronomer confessed, "To tell the truth, with... so huge periods and numbers, the Indian astronomy did look like a pure speculation, a wordy literature displaying elements of pure fancy".

The large periods imparted a flexibility to the Indian astronomers. As mentioned in a previous issue, Indians have been comfortable with large numbers right from the early Vedic age. The huge periods enabled Indian astronomers to avoid inconvenient fractions involving years, months, days etc. and further subdivisions, and express their findings as plain integers. As we have seen, the single integer 1577917500 represents the fraction 365 or the long expression "365 days 6 hours 12 minutes 30 seconds". Note that decimal fractions (notations like 365.25868) had not yet been invented.

Besides, time was divided sexagesimally : 1 nakshatra dina (sidereal day) was divided into 60 nadika (or ghatika); 1 nadika into 60 vinadika; 1 vinadika into 6 prana (respiration);

1 prana into 10 gurvaksara (long syllables). Therefore, the number 4320000, being a multiple of 603, would have been suitable for expressing an estimate in integers!

Some Historical Remarks

“Indeed I believe that when in time to come the contributions of Indian and Buddhist thought are really taken in hand from, the point of view of natural science, it will be found over and over again that the philosophers of these culture areas have shot their arrows correctly to the spots that the mountaineers of science would reach definitely much later on.”¹² Aryabhata seems to be the first Indian “mountaineer of science” to “reach” axial rotation; but a few “arrows” had reached the “spot” earlier. Several Vedic scholars have pointed out indications in the Rig Veda of axial rotation and heliocentric revolution of earth ([3], p 19). There are passages in the Aitareya Brahmana (III.44)¹³ and in the Vishnu Purana (Chap VIII, Part II, Verses 14 and 15) mentioning that, in reality, the sun never rises nor sets. In the Skanda Purana (1.1.31-71), the earth is described revolving like a bhramarika or spinning top ([1], p 8).

Notwithstanding such incidental, and often cryptic, remarks in the vast mass of the allegorical Vedic and Puranic literatures, the earth was traditionally regarded as stationary both in astronomy as well as ritualistic treatises. Aryabhatiya is the first known astronomy text in India which clearly mentions the axial rotation of earth. It was a revolutionary principle (pun intended !) which was in shocking contrast to the impression one would acquire both from conventional knowledge as well as daily observations. One is reminded of the tribute on Copernicus by Bruno¹⁴: “Copernicus not only moved the earth but also set in motion the minds of men.” Fortunately, Aryabhata lived in a liberal and tolerant society where such unorthodox views did not risk the kind of persecution which befell Socrates, Bruno or Galileo.

However, the theory of axial rotation of earth was not acceptable to most Indian astronomers right from Varahamihira. Brahmagupta (628 AD), in particular, was fierce in his criticism of this theory. Various difficulties were raised (see [11] for details): if the earth were rotating at such a tremendous speed, then all buildings would have crumbled down, people could not have stood still, there would have been constant earthquakes, birds flying in the sky would not have been able to return to their nests (which would be continuously shifting from their original positions), etc. Brahmagupta pointed out that a heavy body, when falling from even the highest peak of a mountain, invariably falls at the foot of a mountain. He asked: “The circumference of the earth is 25000 miles and the earth takes 24 hours to complete a revolution on its supposed axis; hence the earth moves at over 1000 miles per hour or 16 2/3 miles per minute. Now if a heavy body takes 30 seconds to touch the ground, by that time, the earth has moved 8 miles. Therefore, how can the body fall at the foot of the mountain?”¹⁵

Such arguments might amuse the modern readers. But without the clarity brought about by Newtonian mechanics, it would not have been easy to understand the dynamic equilibrium of terrestrial body and address such questions. Even during the 16th century,

Copernicus did not have satisfactory answers to all the riddles. The arguments are thus instructive in our understanding of the evolution of astronomy and mechanics.

It is interesting to note that one astronomer who vigorously defended Aryabhata's principle was Chaturveda Prthudaka Swami (860 AD), a commentator of Brahmagupta (who was a virulent critic of Aryabhata); while many followers of the Aryabhata school of astronomy - who always put Aryabhata on a very high pedestal- criticised his theory of axial rotation. Perhaps this reflects the intellectual robustness of the era - the prevalence of a critical scientific attitude and a spirit of free enquiry.

It would perhaps never be known what prompted Aryabhata to assign an axial rotation to earth, how exactly he got convinced of such a theory - which he asserted so strongly and confidently - and whether he had ingenious answers to the various counter-questions. After all, the theory of rotation of earth did not, in any way, simplify the methods of calculations in Aryabhatiya; nor was it used in the text to explain any astronomical phenomenon. If we take out his specific statements on rotation of earth, the rest of Aryabhatiya remains the same whether we take rotating or stationary earth.

We mention here that, inspired by the ideas of Paramesvara, Nilakantha developed a heliocentric model for the solar system- a significant achievement decades before Copernicus. Both Paramesvara and Nilakantha belonged to the Aryabhata school.

Miscellaneous

Aryabhatiya has around 85 verses on astronomy and in this issue we have discussed only one verse (Gola 9) and a small portion of another verse (Gitika 3). This would give an idea of the vastness of topics touched in the text. We now briefly mention a few other facts in the text which do not involve computational or technical discussion.

Aryabhata realised that the earth and the planets are not self-luminous but receive and reflect light from the sun. He stated (Gola: Verses 5 and 6) that the earth is spherical and that halves of the globes of the earth and the planets are dark due to their own shadows; the other halves facing the sun are bright. He explained the true causes of the lunar and solar eclipses. An awareness of some of these facts can be traced in the Rig Veda ([3], p 19-21).

Aryabhata developed the theory of epicycles (a small circle rolling on the circumference of a greater circle); and, used it to represent and explain the motion of the planets. The epicyclic theory of Aryabhata, admired for its inherent beauty, had a profound effect on subsequent Indian astronomy. It is a good approximation to the modern theory of elliptic orbits. For more details, see ([9] or [3]).

In the Indian tradition, Aryabhata does not have the stature of a divinely inspired sage, unlike, say, Panmi. As Colebrooke observed ([5], p 426) : "He is considered by the commentators of the Surya siddhanta and Siromani, as the earliest of uninspired and mere human writers on the science of astronomy;..." But his scientific legacy has made Aryabhata a popular household name throughout India. He is revered with the same esteem as is accorded to members of the legendary "Nava-ratnas" like Dhanvantari, Kalidasa or Varahamihira. While his contribution in mathematics has been seminal, his originality and

greatness stands out in astronomy. India's first artificial satellite, launched on 19 April 1975, was appropriately named "Aryabhata".

Reference:

1. The celebrated astronomer-mathematician is popularly known as "Aryabhata" in Indian languages. Early Indologists like H.T. Colebrooke (1817) too spelt the name with double "t". However, as Bhau Daji (1865) pointed out ([6], p 518), the Sanskrit spelling of the name, as found in the manuscripts of Brahmagupta and others, corresponds to "Aryabhata". Indian historians of science and organisations like the INSA have adopted "Aryabhata" as the official spelling (see [6], p 629).
2. Not to be confused with the extant text *Arya-siddhanta* (sometimes called *Maha-Arya-siddhanta* or simply *Mahasiddhanta*) which was written by another astronomer-mathematician, also named Aryabhata, who lived around 950 AD, and who is referred by modern historians as Aryabhata II.
3. The statements in their works indicate the existence of such a school and that they were conscious of belonging to the school.
4. Due to the perishability of writing materials (palm-leaves) in Indian climate, an ancient Indian text could survive only if it was perceived to be important enough to be copied from time to time or memorised by successive generations, as was done in the case of the spiritual, philosophic and literary classics. But if a technical text like *Aryabhatiya* rendered an older text redundant for practical purposes, the latter would have negligible chance of survival. A modern historian therefore has to rely heavily on indirect evidences from literary and metaphysical texts to get, at least, stray ideas about post-Vedic, pre-Aryabhata science in India.
5. For instance, consider Verses 32 and 33 of *Ganita* : "Divide the greater number by the smaller number. Divide the resulting numbers mutually. Multiply the final remainder by an optional number; to the product add the additive. Multiply by the penultimate number the number just above it and then add the number just below it. Divide by the abraded numbers." This is Aryabhata's description of the *kuttaka* algorithm (discussed in the October 2002 issue)! Some of his verses would probably be the best illustrations of the English word "cryptic".
6. The current *Kaliyuga* is supposed to have begun on Friday, 18 February, 3102 BC.
7. This was also emphasised by P.C. Sengupta several decades earlier - see [3] or [9]. In fact, the various articles and books of Sengupta played a significant role in the subsequent understanding of Aryabhata's astronomy.
8. The details regarding the methods used to be transmitted orally - they were not incorporated in the *sutra* compositions. In course of time, with the break in the oral links, the details got lost.
9. Lanka is a standard reference point in Indian astronomy. It denotes the point on the equator, south of *Ujjayini*, lying on the great circle passing through the north pole (also south pole) and *Ujjayini*. For instance, in *Aryabhatiya*, the dawn of day is reckoned from the mean sunrise at Lanka.
10. The word "sidereal" is used as a reference to the "fixed stars" - the heavenly bodies which have fixed angular distances between themselves relative to an observer on earth. A "sidereal day" (*nakshatra dina*) is the time taken by the fixed stars to go round the earth once (relative to an observer on earth). This differs slightly from the solar day which is the duration between two successive sunrises.

Since the duration of a solar day varies slightly from day to day, one considers the average duration - it is called the mean solar day. An hour is defined so that 1 mean solar day = 24 hours. As a consequence of the annual revolution of the earth around the sun, to an observer on earth, the sun appears to move from west to east, relative to the fixed stars, at the rate of about one degree per day. As a result, the fixed stars take slightly less than 24 hours (a mean solar day) to complete one rotation around the earth, i.e., the sidereal day is slightly less than the mean solar day. Clearly the sun takes one year to complete a cycle (i.e., to return to a given position). This (apparent) annual path of the sun is called the *ecliptic*.

A sidereal solar year is the interval between two successive passages of the sun through the same

point relative to the fixed stars; or, equivalently, the length of the period of the heliacal rising or setting of a fixed star. (It is the period of earth's revolution around the sun.) Clearly in x sidereal years, if the sun makes n revolutions around the earth with reference to the fixed stars, then the stars themselves will have completed $n + x$ revolutions around the earth, i.e., n mean solar days = $n + x$ sidereal days.

11. To arrive at this exact figure, the reader is advised not to convert the given fraction to decimal fraction (as is done in some astronomy texts) which would introduce rounding-off errors leading to avoidable approximations. Rather convert the fraction to a mixed fraction; multiply the proper fraction part by 24; again convert the product into mixed fraction; multiply the proper fraction by 60;
12. J. Needham: "Within Four Seas" (p. 179)
13. About this passage, Monier Williams remarked (Indian Wisdom p 35): " We may close the subject of Drah-manas by paying a tribute of respect to the acuteness of the Hindu mind, which seems to have made some shrewd astronomical guesses more than 2000 years before the birth of Copernicus
14. N. Copernicus was the first astronomer in modern Europe to enunciate (1543 AD) the principles of axial rotation and heliocentric revolution. G. Bruno (b 1548) was a vociferous exponent of the Copernican theories for which he was burnt at the stake in 1600 AD.
15. There is, in fact, a small eastward deviation of a falling body; but it would not have been possible to detect such minute deviations with the technology of the ancient times. The deviation is caused by the fact that points which are at a greater distance from the earth's axis of rotation move with a greater velocity than those near the axis. As a result, when a stone is dropped from the top of a very high tower, its initial eastward velocity is greater than the eastward velocity of the base - so the stone actually falls to the east of the vertical line through the point of dropping. This eastward deviation is actually a proof of earth's rotation. Such a deviation had been detected, for instance, by Foucault's Pendulum experiment in 1855.

Suggested Reading

1. K.S. Shukla and K.V. Sarma : *Aryabhata of Aryabhata*, Indian National Science Academy, New Delhi (1976).
2. S. Balachandra Rao : *Indian Astronomy - An Introduction*, Universities Press (2000).
3. P.R. Ray and S.N. Sen (ed) : *The Cultural Heritage of India Vol VI : Science and Technology*, The Ramakrishna Mission Institute of Culture, Calcutta (1986).
4. D.M. Bose, S.N. Sen and B.V. Subbarayappa (ed) : *A Concise History of Science in India*, Indian National Science Academy, New Delhi (1971); reprinted (1989).
5. H.T. Colebrooke : *Dissertation on the Algebra of the Hindus* (1817) reprinted in *Essays on History Literature and Religions of Ancient India Vol II*, Cosmo Pub., New Delhi (1977); also reprinted in [6].
6. D. Chattopadhyaya (ed) : *Studies in the History of Science in India Vol II*, Editorial Enterprise, New Delhi (1982).
7. B.V. Subbarayappa and N. Mukunda (ed) : *Science in the West and India*, Himalaya Publishing House. Bombay (1995).
8. R. Billard : *L'Astronomie Indienne*, Ecole Francaise d' Extreme-Orient, Paris (1971).
9. P.C. Sengupta. : *Aryabhata, the Father of Indian Epicyclic Astronomy*, J. Dept of Letters, Univ. of Calcutta 18 (1929), 1-56; reprinted in [6].
10. K.S. Shukla : *Glimpses from the Aryabhata-Siddhanta*, Indian Journal of History of Science 12 (1977), 181-186.
11. S.R. Das : *Motion of the earth as conceived by the ancient Indian astronomers*, Bulletin Calcutta Math Society 17 (1926), 173-182.
12. "Truth does not pay homage to any society, ancient or modern. Society has to pay homage to truth or die." [Swami Vivekananda : *The Complete Works II* p 84]

The Indigenous 'Prajna Model' of Indian Manufacturing, Business and Management

Narendra Joshi

Sri Aurobindo in one of his early cultural writings has written an essay named 'The Stress of the hidden spirit.' Here he explains to us the obsession of the modern rational man with mechanistic world view which is trying in vain to understand the world in the form of a giant machine. Uniformity, massification and aggrandization are the corollaries of this view and individual's progressive dehumanisation is its effect. Something similar he has written in the opening part of *The Ideal of Human Unity* and in many of his other writings. In modern industry human beings, raw material and data enter the highly intelligent and automated system : they come out with value deduction for humans and value addition for the rest!! Thus has been the feverish pursuit of making machines and systems more intelligent while doubting the presence of the same in human beings inside an industry, an organization or in the society today. However, here in this essay cited above, he then puts it very succinctly that in Indian culture with such diverse and at times even diametrically opposite darshanas and philosophies throughout the history of at least ten thousand years or more, the idea of the world as a machine or even a sort of linear mechanical system has been conspicuously absent. The Upanishads speak of a cosmic inverted tree, a web of spider, sparks of fire, honeycomb, a tree and two birds, spokes of wheel and many models but not a linear logical mechanistic model ever. In the words of Sri Aurobindo,

The world is a great game of hide and seek in which the real hides behind the apparent, spirit behind matter. The apparent masquerades as real, the real is seen dimly as if it were an unsubstantial shadow. The grandeur of the visible universe and its laws enslaves men's imaginations. "This is a mighty machine," we cry, "but it moves of its own force and needs neither guide nor maker; for its motion is eternal." Blinded by a half-truth¹ we fail to see that, instead of a machine without a maker, there is really only an existence and no machine. The Hindus have many images by which they seek to convey their knowledge of the relation between God and the world, but the idea of the machine does not figure largely among them. It is a spider and his web, a fire with many sparks, a pool of salt water in which every particle is penetrated by the salt. The world is a waking dream, an embodied vision, a mass of knowledge arranged in corporeal appearances expressing so many ideas which are each only a part of one unchanging truth. Everything becomes, nothing is made. Everything is put out from latency, nothing is brought into existence. Only that which was, can be, not that which was not. And that which is, cannot perish; it can only lose itself. All is eternal in the eternal Spirit.' (The Harmony of Virtue, Early Cultural Writings — 1890-1910, Karmayogin: A Weekly Review, Saturday 26th February 1910 — No.34: p362)

This is extremely significant. As this organic and integral worldview which is in fact a spiritual world view of India was then reflected in every expression and creation of her : whether in philosophy, religion, literature, arts and also in sociology, polity, management and economy and even in her models of trade, commerce, industries and manufacturing.

The organic interrelated model means the individuals and aggregates are potentially Divine, and united at their spiritual roots or the centre. It means all points in this cosmic mandala are interwoven, interrelated and nothing can be seen as an isolated part. It also means that each part is a reflection of the whole: each is in all and all is in each. Nothing can be created which is not already there. The tree is manifested from seed not created out of nothing. So much insightful and significant. He further explains:

Therefore in all things the Hindu thinker sees the stress of the hidden Spirit. We see it as prajñā, the universal Intelligence, conscious in things unconscious, active in things inert. The energy of prajñā is what the Europeans call Nature. The tree does not and cannot shape itself, the stress of the hidden Intelligence shapes it. He is in the seed of man and in that little particle of matter carries habit, character, types of emotion into the unborn child. Therefore heredity is true; but if prajñā were not concealed in the seed, heredity would be false, inexplicable, impossible. We see the same stress in the mind, heart, body of man. Because the hidden Spirit urges himself on the body, stamps himself on it, expresses himself in it, the body expresses the individuality of the man, the developing and conscious idea or varying type which is myself. Therefore no two faces, no two expressions, no two thumb-impressions³ even are entirely alike; every part of the body in some way or other expresses the man. The stress of the Spirit shows itself in the mind and heart; therefore men, families, nations have individuality, run into particular habits of thought and feeling, therefore also they are both alike and dissimilar. Therefore men act and react, not only physically but spiritually, intellectually, morally on each other, because there is one self in all creatures expressing itself in various ideas and forms variously suitable to the idea. The stress of the hidden Spirit expresses itself again in events and the majestic course of the world. This is the Zeitgeist, this is the purpose that runs through the process of the centuries, the changes of the suns, this is that which makes evolution possible and provides it with a way, means and a goal. 'This is He who from years sempiternal hath ordered perfectly all things.' (Ibid p 364)

This also stresses the importance of decentralization and diversity. Each is essentially one but manifested in different way, in a unique way. That is the Prajna explains Sri Aurobindo.. The stress of the hidden spirit. That is why no two trees, no two branches of same tree, not even identical twins are exactly same, each is unique like unique thumb impressions. There is similarity among the class and the type like all mango trees will be similar in spread and shapes of leaves and fruits and yet each is unique in itself. So are human beings. So must be the systems and methods designed for fulfilling his Chatur purushartha : Dharma, Artha, Kama and Moksha. That is how even the models for management, business, manufacturing and economics, were manifested and then were documented in India. We must remember that they were in their best expressions based on this organic and integral world view.

That is why Sri Aurobindo emphasized that the value of the Indian conception of life will depend on how well we can connect these diverse individual paths to the unifying central

perfection, here all can be allowed to travel on path as per their swabhava and swadharma and should not be put under the same table of laws. (The Foundations of Indian Culture)
We will see some representative examples of this in following paragraphs.

Kanagsabapathi in his 'Indian models of economy, business, and management' explains: "The history of India's trade and commerce goes back to the Phoenician times when spices, ivory, silks, fine cottons and precious stones were carried out." "In ancient times both the internal and external trade were at their peak. The trade in textiles was very common. Silks were imported from China, and from Central Asia came pearls and very fine wool. India mainly exported cotton cloth. The articles of export and import consisted of seashells, areca nut, sandalwood, gold, silver, pearls, precious stones and coral." "Even some 53 centuries ago, the people were linked in a vast trade network, much of Harappa's trade undoubtedly travelled along the Ravi river, eventually reaching the Indus. And some surely went by that main stream river to Mohenjodaro, Harappa's sister city some 400 miles to the south. Traders from the north waited to present turquoise and lapis lazuli to a Harappan merchant weighing beads." (Agarwala through Kanagsabapathi) India was a pioneer in developing new tools and technologies since the ancient days, when no country had any idea of them. Not only Agricultural efficiency was world class but even in Industrial production was at very high level. "...ancient India not only had business forms that easily met the notion of a contracting entity, but also had business forms that went considerably further with many features that are common to more recent organizational forms such as corporations." (Khanna through Kanagsabapathi)

India was among the top three economic powers in the world from early centuries of her history till 18th century. This is now elaborated with lot of evidences in Maddison report and quoted by several authors. A specialized industrial and technical education was offered in both centralized and decentralized education system. The artisans and the guilds educated the next generation in necessary skills in many arts and crafts. That the Harappan bricks were made with such precision and strength that "...The bricks contained no straw or other binding material and so turned out to be usable 5,000 years later when a British contractor dug them up to construct a railway line between Multan and Lahore. And while they were made in 15 different sizes, the Harappan bricks were amazingly consistent: their length, width and thickness were invariably in the ratio of 4:2:1." "The testimony of Megasthenes, corroborated by the Arthashastra, shows that in Mauryan times, prices were regulated by market officials. The latter text suggests that, as a further effort at maintaining a just price, government officers should buy on the open market when any staple commodity was cheap and plentiful, and release stocks from government stores when it was in short supply, thus bringing down the price and making a profit." (Kangasabapathi)

Indian management, industry, business, and trade were world famous for the values, workmanship, unique designs, creative joy embedded in every product, and above all for the honesty of people involved in the chain of business. Merchants and manufacturers would never cheat in weight, quantity or quality. We must understand this as an outcome of their approach to work. When work is a kartavya, swadharma, an art and is also a yoga, pride in workmanship, when it is more for Swantsukhay- self satisfaction, then a spontaneous display

of such ethical values is natural. Profit is only a by product of such deep reverence for the work. To act itself is a fruit and how a fruit can be expected to have another fruit! (Sant Jnaneshwar)

They did the work as worship, for creating value in self and in their product. There was a god for skills namely Vishwakarma who is revered by many of the Indian craftsman, Nataraja is worshipped by artists. Even traders and businessman are doing worship of Lakshmi, of their books and other sages. When such is the base of the business, cheating is unlikely to be the trait. Marco Polo bestowed generous praise on the merchants: 'you must know that these Abraiaman (Indians) are the best merchants in the world, and the most truthful, for they would not tell a lie for anything on earth,' Even if a foreigner leaves his goods with Indian merchants they will sell that and give him the profit with zero commission.

Many trade routes were having temples, caves with magnificent architecture, chityagruhas, on their route where they will stay for a while. There are several incidents when traders went with religious missionary to foreign land, both fulfilling need of each other. Having spiritual discussion or listening to spiritual talk, songs, stories in evening after a long day of business was part of the routine. There was all over India a network of the local wise men, kirtankaras, pravachankaras, folk artists, performing artists, priests, Buddhist, Jain or Shaiva, Vaishnava bhikshus and welcoming them, listening to them, supporting them was a common practice. Many of the traders have supported dharmashala construction, donated generously for public amenities, donated for temple and cave buildings. Arth was created with zeal and then spent with dispassion and trusteeship of the money was told by many saints and sages in various local languages. The spiritual element thus was not just in the Vedas and the Upanishads but it was percolated to all levels of the rural and urban societies in all ages through the work of these cultural messengers.

Moti Chandra's 'Grand Route' gave details of trade routes across India , Central and West Asia and China. He (1977) quotes Arthasastra of Kautilya about another route between Ganga Plains to Deccan, i.e. 'Dakshinapatha', Persians, Romans and Greek were well knitted through trade links. Many cities had advanced technology. Suttanipata an ancient text in Buddhism tells about the cities from Sravasti in Kosala to Dakshinapatha Pratisthana, Mahishmati, Ujjayanini, Gonarda, Vidisa, Vanasavhaya, Kausambi and Saketa where business and trade were prominent. Silk route was not only for China, but also with Japan, Persia, and many other countries. (December 28, 2016 <http://www.iiem.in/blog/amazingly-efficient-trade-logistics-in-ancient-india/>) 'Over 90% of the trade was via sea routes from a large number of ports like Lothal in the present day Gujarat, to Surat, Sopara , Vizag ontrading to the Mediterranean Sea and to many Southeast Asian countries for saling gold, spices, cotton, and many more goods that are valuable. They were taken to Mesopotamia, Egypt, Africa, Arabian Peninsula and many other regions of the world via sea routes across the Indian Ocean. during the rule of Pallavas, Cholas and the Chalukyas The trade reached its pinnacle.' (<http://www.iiem.in/blog/amazingly-efficient-trade-logistics-in-ancient-india/>)

The Art of making iron was well practised in India from very early times, and the iron

and steel produced were shaped into various useful articles. Sushruta, (3rd or 4th century B.C.) in his book has wrote of hundreds of intricate very tough to make surgical instruments of metal. The vivid descriptions of swords, spears, and other steel weapons was testimony of our prowess and so is in Porous and Sikander's battle description. The famous Damascus swords were actually Chola era steel products and entirely a unique Indian steel. The well-known Iron Pillar (300 A.D.) in Delhi, a 20 ft high unique pillar is not a casting and is in fact welding together discs of forged iron and is yet free from corrosion with carbon and other elements controlled to perfection.

'The antiquity of the Indian process is no less astonishing than its ingenuity. We can hardly doubt that the tools with which the Egyptians covered their obelisks and temples of porphyry and syenite with hieroglyphics were made of Indian steel. There is no evidence to show that any of the nations of antiquity besides the Hindus were acquainted with the art of making steel. The references which occur in Greek and Latin writers on this subject, served only to add to their ignorance of it ; they were acquainted with the qualities and were familiar with the use of steel, but they appear to have been altogether ignorant of the mode by which it was prepared from iron. The claims of India to a discovery which has exercised more influence upon the arts conducing to civilisation and the manufacturing industry than any other within the whole range of human invention is altogether unquestioned'. —T.A. Heath (1839). 'The Hindus excel in the manufacture of iron. They have also. workshops wherein are forged the most famous sabres in the world. It is impossible to surpass the edge you get from Indian steel.'—Arab Edrisi. 'Without doubt, therefore, the process of making iron and steel has been used in India for thousands of years It may, therefore, easily have been the case that the ancient Egyptians were familiar with Indian iron and steel and either imported the material or obtained the services of Indian workers in metals to produce the necessary material for the tools employed on the great stone monuments.'—Sir Robert Hadfield. (A brief history of the Indian iron and steel industry, K. N. P. Rao, <http://eprints.nmlindia.org/5558/1/1-7.PDF>)

The hereditary families were pursuing certain branches of trade, formed into a corporation with a Jetthaka (Elderman) as its head. The whole villages were inhabited by one and the same class of artisans, the Mahavaddhakigamo, for instance, consisted of 1000 families of dealers in wood, and the Kammaragamo, the same number of smiths' huts. Samudda-Vanija Jataka mentions that near Varanasai was a place of thousand families of carpenters headed by two master women, each as the head of five hundred of them. "...cultivators, traders, herdsmen, money-lenders and artisans" to lay down rules for their respective classes, and we are further told that the king shall give the legal decision after "having learned the (state of) affairs from those who (in each class) have authority (to speak)": such is given in dharmasutra. In other words, these groups srenis or guilds enjoyed local autonomy with minimum interference by the central authorities.

Kautilya's Arthasastra, says that the "Superintendent of Accounts" had to maintain and regularly update prescribed registers, which will have the history of customs, professions and transactions of the corporations. The village guilds were protected by the regulations

that no outside guilds of any kind shall find entry into the village. Many more examples can be cited from Kautilya's works, from Jataka, from Yajnavalkya and manu and other recent works on the subject. (Kautilya's Arthashastra, R. Shamashastri, https://csboa.com/eBooks/Arthashastra_of_Chanakya_-_English.pdf)

In conclusion:

It is often said that India lacked prowess in manufacturing or management and the trade was mostly of agrarian or raw material like cotton, jute, spices, foodgrains, etc. There was not much done in manufacturing or in intricate production. Then the argument is if that is assumed for a while the case then why mass production was not done or why India never had large scale industrial set ups. The critics forward this as a proof to show that India never had a proper management or manufacturing industry itself. That is blatantly misleading. From building of ports, to manufacturing huge ships, to making finished products in copper, clay, metal, wood, textile, stones /ceramics....the prowess of India in Manufacturing, management, and trading was remarkable. There are enough evidences in Smirti, Shastra, especially Arthshastra and even in Jataka katha about how an aggregate say a family /extended family or kula /Shreni / geographical area was specialized in a particular skill and thereby in a particular business like pottery, ceramic ware, steel making, weapons, utensils, metal crafts and so on and each of these was decentralized, where human element and efforts were emphasized. Where the Prajna: the stress of that hidden spirit, can be kindled in every artist , craftsman, trader and manufacturer. When work is also an art, a yoga, a sadhana. That can happen only when massification is not done, when uniformity is avoided and individuality is allowed, when producer and consumer are either one or are organically linked. Then only not just quality but beauty will be born in the product, Then the Divine element which reflects in creativity, originality, piousness, ethical standards will be manifested. These are at the heart of the organic indigenous 'Prajna model' of India. The decentralization also ensures that there are no populations migrating from rural to few crowded cities. As means of employment are made available at their place of staying itself, they are close to their family, children , to their community, and yes, close to Nature. This takes care of many of the psychological needs and social needs. The highly centralised model has broken families, brought dirt and vulgarity to few perceived centres of productions and cities, poor amenities, neglect and exploitation for more output, with hollow lost human individuals. Human intervention and soul expression, pride in doing something aesthetic and not just useful were involved in each product and therefore there was minimum automation, not because laws of physics were unknown to us. Else Newton's and Tesla's laws of physical universe were already discovered by our rishis and what quantum mechanics is discovering now, was already proclaimed by our ancient rishis. So why they did not use these laws for making huge mechanical systems, on par with these modern uniform, massified expressions? The reason is, what should be the use of any scientific idea, discovery or shastra in general was not left to any egoist untamed intellect in society who with some selfish motive can create havok with such discoveries. It was decided by the rishis, seers, the creative minority of the society. Thus the model of industry and manufacturing set up and the mode of trade and business management was all based on the basic purpose of human life as envisioned by these seers, and that was then obeyed by our

great forefathers. Individual's growth, his or her creativity and accelerated evolution were more valued in any action of life than immediate gains. Hence eagerness to scaling up of any enterprise and massifying temptations with a demonic utilitarian mechanistic model as is prevalent in this age was largely discouraged and absent in India. What Schumacher said in *Small is Beautiful* or Toffler said as third wave of post industrial age of knowledge based world was in its true sense practised in India. Prajna economy and not just knowledge economy is Indian model. That is needed to be again expressed in Indian management, business, trade and economy. It is akhandmandalakar evolution spiral of individual to family to shreni to gram and to Rashtra and to then the Vishwa. Here the real turn to subjectivity comes and the ideal of human unity can be envisaged when your vishaha (small productive aggregate) will be so designed as to lead you seamlessly to your conscious evolution to Vishwa (the world.)

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Vānaprasthāśrama: Source & Inspiration for Social Activism in Modern India

Shrinivas Tilak

I- Introduction

Albert Schweitzer in his *Indian Thought and Its Development* contended that Indian thought and culture were life and world negating as opposed to the Christian thought, which is life and world affirming. Indian outlook was negative because it was oriented to the abandonment of the world for personal 'salvific' benefit through Yoga. It eschewed all activity, which aims at an improvement of the conditions of life in the world or removing the miseries and sufferings of the fellow beings (1952: 19-31). Decades later, after an exhaustive survey of the humanistic tradition in India, an American Indologist and Sanskritist Troy Wilson Organ, came to an opposite conclusion in his book *The Hindu Quest for Perfection* that Hinduism is an attempt of a specific culture rooted in Yoga that answers two related questions: "What is man, actual and ideal?" and "How can actual man become Ideal Man?" (1970: 337). Schweitzer's description of Hinduism as a spiritual tradition that was disinterested in social and political concerns and issues, nevertheless, prevailed and constitutes the chief plank of the typical Orientalist view of India and Hinduism today. In light of the above, this paper seeks to answer the following question: Is the activist impulse based on the [Sāṃkhya] Yoga darśana as we find it in social activists like Anna Hazare (and spiritual gurus like Baba Ramdev and Sri Sri Ravishankar) historically new (i.e. responses to uniquely modern conditions and historical forces essentially informed by non-Hindu sources and ideals) or are there substantive precedents for such an impulse in the ancient Vedic and post-Vedic texts and worlds?

II- Tradition of social activism in India

Ṛgveda and other Vedic texts emphasize engagement with life and the ongoing societal system which comes out clearly in the sūktas composed in praise of Uṣas (goddess of dawn) wherein she is seen awakening men from their slumber and dispatching them off to work (1:48.6). In another sūkta composed in her honor (Uṣāsūkta), Uṣas is compared to a widow climbing up the steps of the courthouse for claiming financial assistance after the death of her husband (1:124.7). Activism, positive engagement, and intervention in worldly affairs thus seem to underlie Vedic philosophy of life. Elsewhere the Ṛgveda refers to the city administrator (mayor?) who remained alert in securing the welfare of his citizens (prajāhitadakṣa, 1:173.10) by praising the twin gods Dyau and Pṛthvi as being intent upon securing the welfare of the people (lokaḥitakara, 1:185.9) and Indra himself is praised as lokaḥitakāraka in the Indrasūkta (8:96.13). Statements on social awareness and social activism (however incipient) are also discernible in some of the Upaniṣads (mystical and philosophical reflections on brahman, the ultimate reality). In the Bhagavadgītā (deemed to

be the essence of the Upaniṣads), for instance, Śrīkr̥ṣṇa exhorts that it is not enough merely to chant the name of God. One must also continue to strive and hold firmly to the vow one has taken (satatam kīrtayanto mām...yatantaśca ḍṛdhavrataḥ; 9: 14).

Acharya Vinoba Bhave, widely regarded as the spiritual heir of Mahatma Gandhi, pointed out that the term kīrtana in the above context means ‘the urge to act,’ in the spirit of Karmayoga. He adds that since the time of Kings Janaka and Harṣa, Indian tradition has had a well-articulated and engaged socio-cultural dimension in addition to its (supposedly other-worldly) spiritual dimension (1958 4:16-24). In another context Bhave observed that “He who knows brahman is the best among the men. But among those who know brahman, he who remains active, is the most excellent and complete person (kriyāvān eva brahmavidām variṣṭhah)” (1958 4:16-24). Hindus thus have traditionally been advised to resist a dualistic split between the ‘spiritual’ and ‘social’ domains. To engage in spiritual life necessarily includes social engagement (pravṛtti). In what follows an attempt is made to extend such insights from the tradition of India through the stages of life model of social organization (āśramavyavasthā) with particular reference to the third stage--that of the Vānaprastha (hermit) as exemplified in the public career of the well-known social activist Anna Hazare (b. 1937) who attributes his involvement in activism to the traditional ideal of the yukta vanaprastha, i.e. hermit activist who accomplished assigned tasks in the spirit of Karmayoga.

Āśramavyavasthā

The concept of āśrama was initially aimed at imparting a sociological meaning to and evaluating alternative modes of life then prevalent in India. To call a mode of life āśrama was to give that mode a socially significant meaning of engagement or disengagement in the context of dharma. Kapila, the reputed founder of the Sāṃkhya system, called āśrama the fourfold or four-footed dharma (dharmam catuṣpādam)(Mahābhārata Śāntiparva 262.19,21). From time to time, the term āśrama underwent semantic extension to impart new sociological or cultural meanings and values to activities and institutions within which the pivotal category of dharma could be extended to either a socially engaged or disengaged mode of life (Olivelle 100-101). As proposed by Manu, the term āśramavyavasthā represents a compromise that was worked out between the two competing modes of life: engaging and disengaging (early Vedic and later Upaniṣadic/Buddhist respectively) using the hermeneutical approach of samuccaya.

The four āśramas

Manu coordinated the four principal ends or goals in life (puruṣārthas) with the four stages of the āśrama system: The stages are conceptualised as following one another in a constant and continuous process of cognitive and spiritual growth and fulfilment. They have been traditionally identified as the young student (up to age twenty-five; Brahmācārin), adult householder (age twenty-five to fifty; Gṛhastha), aging hermit (age fifty to seventy-five; Vānaprastha), and elderly wanderer (age seventy-five on; Samnyāsin)(see Chapter six Manu Smṛti). In the student stage dharma is of utmost importance with minimal artha and kāma essential for bodily maintenance. It is known as the period of accumulation of knowledge and good physical and mental health (sancayaparvan). In the householder stage, emotional

and carnal pleasure (kāma) is of paramount importance, but it must be adequately supported by material assets and gains (artha) and tempered by dharma. This stage therefore is known as the period of enjoyment (bhogaparvan). In the third hermit stage the householder is invited to redistribute his wealth and assets among the family members and those others who are in need. It is therefore rightly called the period of distribution (vitarāṇaparvan). Subsequently, a quiet living space is sought, a simple yogic lifestyle is practiced and the close ties with family and community are reduced to the role of a detached counsellor. The final stage is marked by total renunciation, i.e. a period of complete detachment (tyāgaparvan) (Manusmṛiti chapters 3-6).

Vānaprasthāśrama

A dutiful and disciplined Vānaprastha is pledged to the welfare of members of the society, which he/she tries to accomplish by the sādhanā that includes a judicious mixture of the Jñāna- and Karmayoga (jñānakarma samuccaya) as outlined above. While in the student stage one is advised to acquire all necessary skills and experience to qualify for the next stage of the householder in which one is expected to raise a family and fully engage in satisfying all this-worldly desires and needs. The final stage of the Wanderer, on the other hand, involves disengaging from all worldly pursuits committing oneself to seek release (mokṣa). This leaves the Vānaprastha stage as the only suitable period in life to fulfil these goals. Upon formal initiation into the stage of the hermit, the Vānaprastha accordingly will proclaim:

I will tread the path of justice and righteousness; I will actively strive for the welfare of my own self (ātmakalyāṇa) and welfare of the people (janakalyāṇa). I will scrupulously engage in the performance of yajña and I will zealously engage in the cause of the spread of the Āryadharma” (Mahābhārata Ādiparva 91.1).

India has had a long tradition of a large number of such inspiring Vānaprasthas that successfully lived up to the above ideal. Sage Vasiṣṭha, the royal preceptor of King Daśaratha, trained Rāma and Lakṣmaṇa in warfare and diplomacy. Droṇācārya was similarly retained by Dhṛtarāṣṭra to train the Kaurava and Pāṇḍava princes. Kauṭilya voluntarily handed over his office of the prime-minister of Magadha to Amātya Rākṣasa before becoming Vānaprastha. Subsequently he gave India and the world the magnificent treatise on public administration and political economics (Arthaśāstra). This ideal of the Vānaprastha was reinterpreted by Swami Vivekananda for the contemporary times as “ātmano mokṣārtham jagaddhitāya ca,” which later became the emblem of the Ramakrishna Mission (Sil 171).

Yogakṣema: social activism rooted in yoga

In our times, Patañjali’s Yoga is usually presented as stressing the spiritual quest thereby leaving the impression that it is isolationist and indifferent to moral and social endeavor. But traditionally, Yoga presupposed integration of knowledge and activity (jñānakarma samuccaya). Vyāsa in his bhāṣya on Yogasūtra (2:28), for instance, refers to the nine ways in which the natural and social worlds are supported and maintained (dhṛti, which is analogous to dharma). Social activism, as informed by Yoga, is implied in the term yukta, a passive past participle from the root yuj meaning to yoke or engage oneself, from which the term Yoga is derived. What differentiates a ‘socially engaged’ action from actions performed as part of

daily effort of living is the notion of samkalpa, i.e. a willingly and consciously chosen course of action. 'Yuktakarma' or 'socially engaged' action then may be understood as willed, conscious action that flows out of a prior resolve on the part of the actor during each of the four stages of life as pravartaka and nivartaka according to the stage one is in. According to the Vasiṣṭha samhitā, the pravartaka stage encourages one to lead this-worldly life by engaging in the pursuits of material goals and satisfaction of desire and wants (artha, kāma). The nivartaka stage refers to acts that are performed with the intention of transcending this world (1: 19-20) and is styled 'inner karma' because it is sustained by the Yoga of knowledge and is done within one's self (jñānam yogātmakam viddhi yogastvātmani tiṣṭhati). Vasiṣṭha thus may be called an exponent of the doctrine that transcendence could be gained only by the unified action of jñānaand karma(jñānakarma samuccaya)(Walli 45). Similar views are expressed in the Yogavāsiṣṭha which expounds subtle spiritual truths through stories narrated by Vasiṣṭha to Rāma advising him to integrate action and wisdom because liberation (mokṣa) is not attainable solely by wisdom or action. Both must be combined in coordination like the two wings of a bird. There do exist, therefore, substantive precedents for such an impulse in the ancient Vedic and post-Vedic texts and worlds.

III- Anna Hazare:the activist hermit (yukta vānaprastha)

Kisan Baburao (affectionately known as 'Anna' = elder brother) Hazare was born in 1937 in a small village located in the acute drought-prone zone in the district of Ahmednagar, in what is now the state of Maharashtra. Because of poverty he had to leave school after grade seven and make his living by taking odd jobs. In 1962, when war broke out against China large-scale army recruitment was underway. Despite not meeting the physical requirements, 25-year-old Kisan (hereafter Hazare) was selected under an emergency recruitment program. During the Indo-Pakistani War of 1965, Hazare's convoy came under enemy attack and all of his comrades became martyrs with Hazare the only survivor. This led him to reflect on the purpose and meaning of life and death. Soon afterward, he came across a booklet entitled, "Call to the youth for nation building" by Swami Vivekananda in a book stall at the New Delhi railway station, which inspired him to fight in the cause of social reforms (including the crusade against corruption) that catapulted Hazare to national and international fame.

Hazare's life story and personal narrative mirrors, to some extent, that of another social activist Baba Ramadev. Both defied the limitation of a humble birth to overcome personal issues through Yoga. For Hazare, the answer to India's (and ultimately world's) problems, both at individual and collective levels, is to be found in the Yoga sādhanā. Using the medium of Yoga, he wishes to bring unity and morality to India; a nation that has remained divided and stratified along sectarian, linguistic, and regional fault lines. Hazare attributes his social activism, in a general way, to the principles and values of righteous behavior and thinking ('shuddha achara' and 'vichara') at the individual level and insistence upon a spotless, untainted lifestyle ('nishkalanka jivan') and a sacrificing attitude ('tyaga') at the collective level. Like the 'yukta' Vānaprastha, Hazare recognizes and realizes the responsibility owed to the community (samāja) at large. What was a personal experience of his life involving the full potential of his proclivities, capabilities, and preferences, is now put into action at the

level of service (sevā) of the people. All political parties and organizations in the country, he believes, should impart yoga education to help India emerge stronger because youth power is the strength of this nation and awakening it can secure the future of India and Yoga helps achieve it (Nandkumar 2017). While addressing a gathering of over five thousand yoga enthusiasts at Kanteerava Outdoor Stadium in Bengaluru, Hazare told the audience that yoga helped him fight tough battles, even at eighty.

At eighty, I wake up at four in the morning, walk two kilometers, practice yoga and pranayama daily. So, I am healthy to take on the challenges and fight for the causes I believe in. Mooting a success formula for a “Tandurusta Bharat” (healthy India), Hazare appealed the audience to adopt yoga for safeguarding one’s caritra (character), acara (good conduct), vicara (good thoughts), niskalanka jivan (untainted life), tyaga (sacrifice) and the power to swallow insults. “This will take you a long way in life. Our country preaches sacrifice [yajna]. In farming, you see that unless you sacrifice grain and sow it in the soil, you cannot harvest a good crop. We need that selfless grain in life to develop... “You should be young at heart and dream big for your nation. You turn old the moment you lose enthusiasm to work for your country,” he reminded his audience (Nandakumar 2017).

On another occasion Hazare reminded his audience that it is impossible to change the village without transforming the individual. Similarly, it is impossible to transform the country without changing its villages. If villages are to develop, politics have to be kept out. Education without spirituality cannot help development. In the process of rural development, social and economic development therefore should go hand in hand (2017).

IV- Concluding remarks

Unfortunately, over the centuries the ideal of the four āśramas became obsolete and the overall relevance of Manu’s four ideal stages of life model diminished. The productive, humanistic, and the socially engaging way of Yoga sādhanā, too, fell into neglect. The Yogakṣema model has nevertheless retained its morally and socially engaging focus particularly in the context of the Vānaprasthāśrama thanks to Anna Hazare, the social activist. If suitably refocused with an additional slogan such as “Where there is a need; there is a role for us [the Vānaprasthas](jahan kam vahan hum);” it can still provide all Indians inspiration for articulating a socially engaged plan of action for a better India. In its wake then, such ‘modern’ notions as ‘social justice’ and ‘equality’ may not appear so ‘new’ or ‘modern’ after all.

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1. It is important to remember here that ārya is not a racial term; it does not indicate membership in this or that particular race or caste. The Yogavāsiṣṭha defines ārya as anyone who diligently performs assigned duties and desirable deeds and desists from doing deeds that should not be done (kartavyam ācaran kāmam akartavyam anācaran; tiṣṭhati prakṛtācāri yah sa ārya iti smṛtaḥ (YV 6: 54). It insists that noble character (āryatā) can be cultivated by any individual who practices yoga whereby even in the most ignorant individual arises the desire for attaining spiritual liberation (udetiyo gayuktānām atra kevalam āryatā; yā drṣtvā mudhabuddhinām abhyudeti mumukṣatā (YV 6: 55).
2. The inspiration for such a commitment may have come from Rigveda (1:147.3) where we are advised to engage in doing good unto others (paropakāra) while at the same time seeking self realization (paramārtha) without paying attention to criticism or ridicule heaped on by unsavory persons. We should steadfastly remain committed to this ideal

keeping in mind that God is firmly behind us in this enterprise.

3. Monier Williams defined samkalpa as “conception or idea or notion formed in the mind or heart (esp.) will, volition, desire, purpose, definite intention or determination or decision or wish for,...with the root kl ‘to form a resolution, make up one’s mind;’ a solemn vow or determination to perform any ritual observance, declaration of purpose” (Pearson 1996: 262, fn 46).
4. Yatah karmaiva kurvanti jñānino’pi mumukṣavah/Tatastamapi viprendra jñāneścara karma tat (VS 1: 27)(see Walli 1977: 45).
5. Professor Ian Whicher (University of Manitoba, Winnipeg, Canada), who is a practicing yogi, on the other hand, sees Yoga as a responsible engagement of ‘spirit’ (puruṣa) as pure consciousness (self) with ‘matter’ (prakṛti = the essence of psycho-physical being), which includes mind, body, and nature) resulting in a highly developed and participatory human nature and identity. He accordingly interprets the goal of Patañjali’s Yoga as integrated and embodied state of liberated selfhood (2010: 133, 143-144).

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Inclination of Sunrays fall into the Temple and Deities at Arasavalli and Nagalapuram in Andhra Pradesh- A Technological Approach

V. Ramabrahmam

Introduction

Every style of building construction reflects a clearly distinctive basic principle that represents a particular culture and era. In this context the Indian Hindu temple architecture are not only the abode of God and place of worship, but they are also the cradle of knowledge, art, architecture and culture. The practices and traditions of temples exist not only in history but also in present time which greatly influence the socio-cultural life of its people and gives continuity to traditional Indian values.

The word 'temple' is derived from the Latin word *templum* means a sacred precinct. According to the definition temple is a structure reserved for religious or spiritual activities, such as prayer and sacrifice, or analogous rites. Traditionally, the temple is a sacred structure and also an indicative of abode of god or gods. However the Indian temples are not only the abode of God and place of worship, but they are also the cradle of knowledge, art, architecture and culture.

Evidence of Surya worship from Pre & Proto-historic times

The fundamental facts that the Sun is the creator of day and night, and by being the source of light and heat on the earth. Is the creator of life? And producer of food and vegetation must have impressed the human mind from very early times. A. S. Geden has rightly pointed out in the Encyclopaedia of Religion and Ethics. Solar worship has been described as the real religion of India. Sun worship in India can be traced as early as the Neolithic period with the dawn of the farming economy. The deep sense of reverence for the beneficial qualities of the Sun led to its representation in symbolic forms on prehistoric and proto-historic (Indus Valley Culture) objects. Sun-god was regarded not only as the bestower of welfare and fulfiller of desire but also as *Samasta-rogam hartha* (healer of all diseases).¹

Evidence of Sun worship from Vedic times

The cult of sun worship has been prevalent throughout the world for centuries. Ancient Tribes in various parts of the world worshipped the Sun as a universal force. They worshipped Thunder, Wind, Sun, etc. which are natural phenomena. In *Rgveda* these natural phenomena were worshipped as deities. They were personified forms of natural forces.² Which clear from the Vedic names like *Savitā*, *Pūṣan*, *Āditya*, *Vāyu*, *Varuṇa*, *Aranya* and the like.

The Yoga philosophy as propounded by sage *patanjali* attaches great prominence to *Sūryanamaskāra*. It is an ancient exercise aimed at physical and mental equilibrium of human beings.³ *Sūryanamaskāra* is performed the before sunrise and after sunset. Its process consist of ten steps or stages.⁴ The *Purāṇas* describe the god as one who provides light of the universe.⁵ In

Purāṇic literature sun is the son of Kaśyapaprajāpati and Aditi. Poetic imagination conceives sun as travelling in chariot borne by seven horses whose charioteer is Aruṇa. The sun and moon were believed to rotate around mount Mahāmeru.⁶ Though there do not exist many Sun- Temples in India, solar worship is accepted and practiced even today. The importance attached to the 7th day of the month for worshipping sun tell the fact that like other divine being, sun too has some ritualistic tradition.⁷

Evidence of Sun worship from Historical times

Many Gupta inscriptions also refer to Sun-temples.⁸ Thus, by the Gupta period the temple tradition came to be incorporated in the Sun-cult by the orthodox Hindus also. However, it appears that the tradition of temple for the Sun god had come into existence much earlier among the masses under the combined impact of the Hellenized Mithraism and indigenous traditions. From the Gupta period onwards, the Sun-temples also came to be built in bricks and stones. That is why we start getting archaeological evidences of Sun-temples from the Gupta period onwards.⁹ The Brahma Purana prescribes Sun worship for all the castes – Brahmanas, Kshatriyas, Vaisyas and Sudras - to get all the worldly and non-worldly pleasures.¹⁰ No restriction on account of caste is imposed on Sun-worship in the Brhaddharma Purana too.¹¹ After the Guptas, many dynasties of different parts of India patronized the Sun-cult, perhaps for the kingly role of the Sun in heaven. Even the officers, merchants, scholars, fighters, cloth weavers etc. became the votaries of the solar cult.¹²

Description of Arasavalli Temple

The famous Sun God Temple situated in Arasavalli Village which is at a distance of about 1 K.M. east of Srikakulam Town District head quarters of the North Coastal Andhra Pradesh. It is one of the ancient and all among two sun God temples in our Country. According to Padmapuranam, Sage Kasyapa installed the Idol of Surya at Arasavalli for the Welfare of mankind. Therefore, the Surya is of Kasyapasa Gotra. He is also termed as planetary King. According to the ‘Sthalapuranam’ of the temple, Lord Devendra found this temple and installed the existing idol of the sun God commonly known as Lord Suryanarayana Swamy Varu under the following circumstances.



View of Arasavalli Temple

Once Lord Devendra, Ignoring the words of Dwarapalaka Nandi, attempted to force his entry for Darshan of Sri Rudrakoteswara Swamy varu at an untimely hour when Lord Siva was along with his consort. The Dwarapalaka Nandi in the discharge of his duties kicked the intruder. Thus kicked and injured by the Devine attendant Indra fell down senseless. And in his unconscious state Indra dreamt that he would be relieved of his pain of injury in his chest caused by Nandi if he had built a temple and install an Idol of the Sun God. After regaining his consciousness, he remembered what he dreamt.

Following his dream he picked up handfuls of earth three times at a place where he lay, and there he found this beautiful idol of sun God with his three consorts Usha, Chaya and

Padmini. At the base of the idols are the figures of Mathara and Pingala the Dwarapalakas and high up are the two divine saints, sanaka and sanadana holding 'Chatrams' (An Umbrella). The Sun God is depicted as riding over a chariot drawn by Anura, the Radhasaradhy. All these figures are exquisitely carved out of a single black finely polished granite stone.

Sunrays fall on the feet of Suryanarayana Swamy

Sun's rays fell on the Dwajasthambam through the 'gopuram' and touched the deity's feet. Quite remarkably, devotees could witness the phenomenon for six minutes, according to the chief priest Ippili Shankara sarma, "It was, indeed, a rare occasion, as Sun's rays never stayed for more than four minutes in the recent past", he said.

The temple was constructed in such a way that Sun's rays fall on the feet of the deity twice a year, in March and October, even when the five entrance gates are closed. The rays touch the presiding deity in March when the Sun moves from 'Uttarayanam' to 'Dakshinayanam'. It happens again in October when the Sun moves to 'Uttarayanam'. The priests also offered special prayers to the presiding deity on the occasion.¹³



Sunrays fall on the main deity



View of Garbhagriha

Description of Nagalapuram Temple

Nagalapuram is a Mandal Headquarter in Chittoor district of the Indian state of Andhra Pradesh. It is the mandal headquarters of Nagalapuram mandal in Tirupati revenue division. This town is home to Vedanarayana Temple, where the presiding deity Vishnu is in the form of Matsya, the first incarnation of Dasavatara.

Temple reflects the Vijayanagara architectural style Vedanarayana swamy idol facing west. The sanctum sanctorum has Vedanarayana swamy with his consorts Sridevi and Bhoodevi on either side. This is a Matsya Avatar of Lord Vishnu first Avatar, who saved the four vedas from Somakudu and returned to Brahma. Temple Brahmostavam comes on Shukla Dwadasi, Trayodasi and Chaturdasi of Phalguni masam (Agama calendar). Temple architecture is done in such a way that during these three days, the sun rays fall on the main deity feet, navel and forehead, called as "Suriya Pooja". This remarks the start of Summer season as per the holy inscriptions available in the temple.

Surya Puja Mahotsavam

On the eve of the five-day Surya Puja Mahotsavam at Lord Vedanarayanawamy Temple at Nagalapuram in the Chittoor district, the sun rays fell inside the temple on Tuesday evening and the phenomenon will assume several interesting phases with the rays shifting from the feet of the Lord's idol at the sanctum sanctorum to



Sunrays inside the temple

the navel (nabhi) point with each day till March 29.

The temple saw its golden time

during the time of Emperor Sri Krishnadevaraya in the 16th century. The priests said that this astronomical wonder was witnessed at this west-phased temple in the evenings, while the same will happen at the Konark temple in Odisha during the morning session.¹⁴



Nagalapuram inner gopura

Conclusion

The nature god Surya is peculiar in the Universe, his power in the Uttarayana and Dakshinayana is particular. More over the Manasara, amsumadbedagama etc, the works throws much light on the temple building activity of Viswakarma is significant in this issue. The kings of that particular geographical location were interest to construct these types of temples dedicated to surya cult for worship.

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A look at the recent events

One India: One World – Excerpts

SACAR Commemorates

Swami Vivekananda's Historic Speech at the "Parliament of Religions"
in Chicago on 11th September 2020.

One India: One World

Sri Aurobindo on Swami Vivekananda

Sri Aurobindo was also certain that “the going forth of Vivekananda, marked out by the Master as the heroic soul destined to take the world between his two hands and change it, was the first visible sign to the world that India was awake not only to survive but to conquer.”

The lion-heart of Vivekananda sought to shake the world. Yet ... “Vivekananda was a soul of puissance if ever there was one,” said Sri Aurobindo talking of leaven, a power of unformed stir and ferment out of which forms must result, great souls and great influences who live on in the soul of India, “a very lion among men, but the definite work he has left behind is quite incommensurate with our impression of his creative might and energy. We perceive his influence still working gigantically, we know not well how, we know not well where, in something that is not yet formed, something leonine, grand, intuitive, up heaving that has entered the soul of India and we say, ‘Behold, Vivekananda still lives in the soul of his Mother and in the souls of her children.’” Sri Aurobindo concluded with the remark: “So it is with all. Not only are the men greater than their definite works, but their influence is so wide and formless that it has little relation to any formal work that they have left behind them.”

Sri Aurobindo Centre for Advanced Research
Puducherry
A Webinar
11th September 2020, 6.30pm-8.30pm
To commemorate
Swami Vivekananda's
Historic Speech at the
"Parliament of Religions" in Chicago
ONE INDIA: ONE WORLD
Inaugurating
India on the March
A Project exploring the Evolution of Consciousness in India's Cultural History
Dr. Ananda Reddy
Founder, Director
SACAR, Puducherry
Dr. Narayana Joshi
Project Director
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India can be the guru of all nations

September 11, 2020, 2:00 AM IST Speaking Tree in TOI Edit Page | Edit Page, India, Spirituality | TOI

Swami Vivekananda in his epoch-making speech in the World Parliament of Religions at Chicago on September 11, 1893 made the idea of 'One India: One World' very clear as he

addressed the audience as “sisters and brothers of America” and then said, “I am proud to belong to a nation which has sheltered the persecuted and refugees of all religions and all nations of the earth.” He said, “The end and aim of all science is to find the unity, the One out of which the manifold is being manufactured, that One existing as many” – ekam sat viprabahudha vedanti – That which exists is one and sages call by different names.

Swami Vivekananda emphasised that each nation has a destiny to fulfil, a message to deliver, a note to play in the march of nations and when it does that, it serves self and the entire world. For India, the theme has been spirituality, oneness of all existence and pursuing that divine destiny, cherishing at the same time, all diversity.

Sri Aurobindo emphasised: “Why should not India then be the first power in the world? Who else has the undisputed right to extend spiritual sway over the world? This was Swami Vivekananda’s vision. India can once more be made aware of her greatness with her unique expertise in spirituality. He took forward the message of ‘One India: One World’ and gave it a firm footing. He said, ‘I say that it is Sanatan Dharma which for us is nationalism.’”

“India is the guru of nations, physician of the human soul in its profounder maladies; she is destined once more to mould the life of the world and restore peace to the human spirit,” said Sri Aurobindo who declared, “The sun of India’s destiny would rise and fill all India with its light and overflow to Asia and the world.” His message on August 15 and the five dreams he told about give further insight into the grand vision he unfolded for us as he said that India has untold potentialities and therefore has a great part to play in determining the political, social, cultural and spiritual future of humanity.

Sri Aurobindo gave us the way to achieve world unity: “A spiritual religion of humanity is the hope of the future. By this is not meant what is ordinarily called a universal religion, a system, a thing of creed and intellectual belief and dogma and outward rite. It means the growing realisation that there is a secret Spirit, a divine reality, in which we are all one, that humanity is the means by which it will progressively reveal itself here. It implies a growing attempt to live out this knowledge and bring about a kingdom of this divine Spirit upon earth.”

Sri Aurobindo thus advocated, “A spiritual oneness which would create a psychological oneness independent of any intellectual or outward uniformity and compel a oneness not bound up with its mechanical means of unification, but ready always, to enrich its secure unity by a free inner variation and a freely varied outer self-expression. This would be the basis for a higher type of human existence.”

https://www.youtube.com/watch?v=KJD0_umVBQg&t=3950s



Upcoming Events



India on the March Project Training Programme

2nd Oct to 5th Nov 2020

Timing: 6.30 p.m to 7.30 p.m

Week 1:	<u>2nd Oct -8th Oct 2020</u>	
	Friday 2 nd October	Introduction and orientation to training program
	Saturday 3 rd Oct	Talk: IOM Project Concept + Evolution and consciousness
	Sunday 4 th Oct	Talk: Central Concepts of Indian Culture
	Monday 5 th Oct	Pre-recorded talk on Indian culture Reading Material to be distributed
	Thursday 8 th Oct	Quiz and Clarification Q & A
Week 2:	<u>10th Oct – 16th Oct 2020</u>	
	Saturday 10 th Oct	Talk: Focus on Paradigms I
	Sunday 11 th Oct	Talk: Focus on Paradigms II
	Monday 12 th Oct	Reading Material to be distributed
	Thursday 15 th Oct	Participants submit video /ppt for 3min (max) on the week's theme + Clarification Q & A
Week 3:	<u>17th Oct – 23rd Oct 2020</u>	
	Saturday 17 th October	Talk: Modules I
	Sunday 18 th October	Talk: Modules II
	Monday 19 th October	Pre-recorded Talk on Management Paradigms
	Thursday 22 nd October	Quiz + Clarification Q & A
Week 4:	<u>31st Oct – 6th Nov 2020</u>	
	Saturday 31 st October	Five Dreams of Sri Aurobindo
	Sunday 1 st November	Talk – India's Gift to the World
	Monday 2 nd November	Essay and Test paper Questions given
	Thursday 5 th November	Quiz + Clarification Q & A

N.B.

- *Those who are willing to join the Research wing of IOM should submit a proposal by 9th November 2020*
- *All those who want can submit their Interface sample by 5th November 2020 (5min)*
- *Those who complete the course successfully would be issued an e-certificate*
- *Interested participants can apply for an advance training programme after the completion of this course with a nominal registration fee.*

India on the March Intensive Training Programme

**All participants to enroll for the 8-week programme on
Orientation to Sri Aurobindo's Thought**

Weeks	Reading Material	Hearing Material	Weekly Discussion/ talk
1.	The March of Civilization The Chapter of Human Evolution The Eternal East and West The Immortal Nation	Hearing Material	Clarification
2.	Evolution of the Spiritual Consciousness The Cycle of Society The Age of Individualism and Reason The Coming of the Subjective Age	Recorded talk	Clarification
3.	Our Ideal Lines of the Descent of Consciousness An Aspect of Emergent Evolution The Discovery of the Nation-Soul True and False Subjectivism	Recorded talk	Clarification
4.	Human Progress Consciousness as Energy Evolution of the Spiritual Consciousness The Curve of the Rational Age The End of the Curve of Reason	Recorded Talk	Talk
5.	The Spiritual Aim and Life The Necessity of the Spiritual Transformation Conditions for the Coming of a Spiritual Age The Advent and Progress of the Spiritual Age	Recorded talk	Presentation by the candidates over 2 days
6. Readings according to the petals chosen by each	Man and Evolution Indian Literature – 1,2 chapters/ Indian Art – 1,2 Chapters/ Indian Polity – 1,2 Chapters + Selections from Ideal of Human Unity/ Life and Spirituality – 1,2 Chapters/ National Education (CWSA 1)/ Selections on Psychology from CWSA 12	Recorded talk	Clarification
7.	The Evolution of the Spiritual Man Indian Literature – 3,4 chapters/ Indian Art – 3,4 Chapters/ Indian Polity – 3,4 Chapters + Selections from Ideal of Human Unity/ Life and Spirituality – 3,4, 5 Chapters/ Selections from CWM 12/ Selections on Psychology from CWSA 13	Recorded talk	Clarification
8.	The Evolution of the Spiritual Man Continued from the previous week	Recorded talk	Talk and Review

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India of the ages is not dead nor has she spoken her last creative word; she lives and has still something to do for herself and the human peoples. And that which must seek now to awake is not an anglicised oriental people, docile pupil of the West and doomed to repeat the cycle of the Occident's success and failure, but still the ancient immemorable Shakti recovering her deepest self, lifting her head higher towards the supreme source of light and strength and turning to discover the complete meaning and a vaster form of her Dharma.

Sri Aurobindo