

Editorial

From time immemorial our land has been blessed with the presence of seekers of truth whose quest went beyond the boundaries of the classical and modern scientific pursuit. Ancient Rishis of our land, with their pure and expansive minds, have tried to reach out to the eternal truth through contemplation and meditation. The knowledge they discovered have issued forth from their minds as pure streams of wisdom preserved today as vast bodies of wonderful literature. However, while seeking the transcendental they have not ignored the material world. In every field of human endeavor, they sought and achieved progress and prosperity. From psychology and philosophy to economics and politics to art and literature to health and education to mathematics and linguistics to business and administration - the fields of activity undertaken in our land covers the entire space of human thought. The rays of original thought of the ancient Indians have touched all corners of human endeavor. Alas! Today, the children of our motherland have forgotten the leadership role that ancient India played in varied aspects of life.

Moreover, We have been given a distorted view of our history. Many of us in India, still do not know that Sanatana Dharma fosters scientific thinking, and in many places has actually arrived at results that modern science is approaching just now. Nor do we understand the profound relevance, in fact the urgent necessity for Sanatana Dharma in our present day strife torn world. With this objective in mind, we are happy to announce that Samskriti, the culture wing of Amrita Vishwa Vidyapeetham, Amritapuri campus, is releasing the student journal - Samvit. The meaning of Samvit is - knowledge or consciousness. We offer this student journal to everyone who seeks knowledge and higher aspirations in their lives.

Knowledge beyond time



“Spirituality is the core of Indian culture. If we imbibe our culture properly, we will find that it contains solutions to all of our problems as individuals and as a society. That is why swami Vivekananda constantly extolled the youth to develop a heartfelt bond with their country and its culture. At the same time, they need to develop an independent intellect and an open mind. They should find the courage to accept the good and reject the bad wherever they may find it.



Amma has visited so many countries around the world and personally seen so many countries and their people. All of them take pride in and satisfaction in their own heritage and traditions. In fact some of us even ridicule our culture. Only if we lay a strong foundation can we erect a tall building. Similarly, only if we have knowledge and pride in our forefathers and heritage, can we create radiant present and future.

There is one fact that each Indian citizen should remember. Our heritage is incomparable. We should adopt the good from other countries while remaining firmly rooted in love for our own country and its culture.”

- AMMA

(Extracts from Amma's booklet ,Cultivating Strength and Vitality”)

World's First Dentists from India 9,000 years ago

Studies conducted by University of Missouri-Columbia reveal that dentists in ancient India had developed technology to drill teeth and remove decays around 9000 years ago. Tiny holes on the biting surface of male molars that were observed from the fossils in Mehgarh (near Punjab), indicate the existence of dental surgery.



Researchers had believed that the holes on the teeth were to make jewellery until they discovered a set of teeth on the jaws. This resulted in the conclusion that the holes on the teeth were due to a dental surgery. Consequently, the jaws of the fossils were observed using electron microscopes and it was found that the holes were too perfectly rounded to be cavities caused by bacteria. Research indicates that these holes were formed by drills. Experimental analysis proves that these teeth were perfectly healthy and showed no signs of decay or damage. All these assert the existence of skilled and experienced dentists in ancient India.

It was believed that dental surgery originated in Egypt. But according to new paleontological studies, it is now estimated that dental surgery existed 4000 years older than the prevailing estimate.

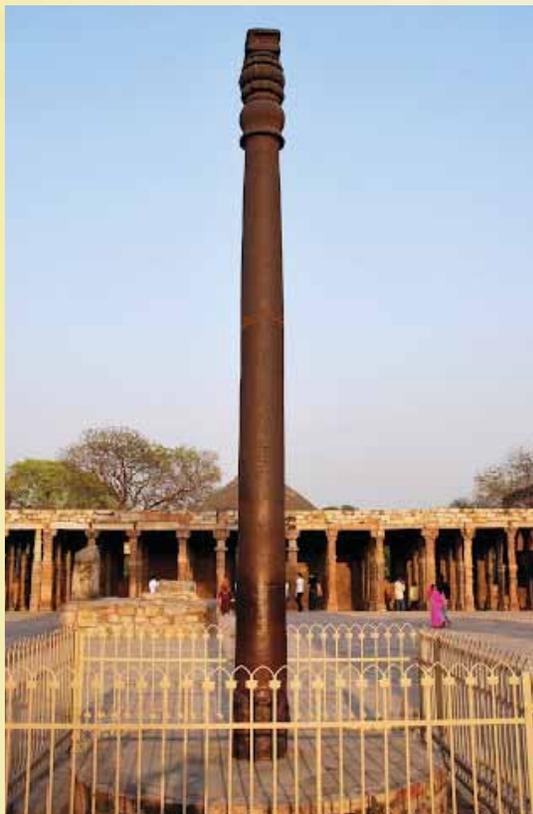
Source: New Scientist

Rustless Wonder

Science and technology have made astonishing strides in numerous directions in human life. It would not be an exaggeration to state that modern technology dominates our lives and our modes of thinking like never before in human history. Human life is very much dependent on metals. Right from the cradle to the coffin, metals give company to man and enrich his life in manifold ways.

Apart from being known among the earliest metals, usage of iron has steadily grown in stature. Ancient and medieval India made its countrymen proud and made a tremendous impact on the world scene through many astounding achievements in iron and steel technology. Among India's achievements, the celebrated iron pillar at Delhi occupies a prominent position in the field of iron technology.

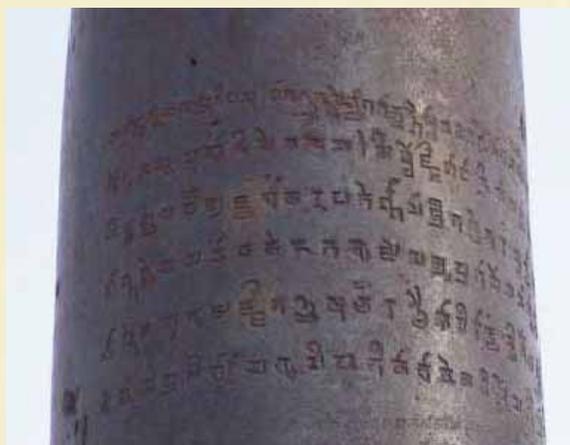
The Iron pillar, known as Lohe-Ki-Lat, is located in Mehrauli village on the outskirts of Delhi. This 24 feet high 6000kg massive pillar has been in existence for 1500 years and is believed to have been fabricated during the Gupta period (320 C.E to 495 C.E). Based on the inscriptions, it is known that Chandra Gupta Vikramaditya II erected it at Vishnupadagiri, otherwise called Udayagiri. The historians believe that initially the pillar was a part of the temple complex of Rai Pithora constructed by Ananga Pala. Later when the temple was converted into a mosque by Qutub-Ud-Din-Aibak, the pillar was permitted to stand but history discloses neither the maker nor the purpose behind making it.



As an Indian one should always be proud of the glorious past of his forefathers. Unfortunately the promise and the richness of experience in the ancient past have not been realised in later years. Today in free India, the young metallurgist should look backwards for inspiration to this bygone age when great things were accomplished and cherish the hope that he might be in a position in the not too distant future to emulate those who wrought the Iron Pillar at Delhi and thus make his contribution to the advancement and practice of the science and art of metallurgy.

Source:

Rustless Wonder - A Study of the Iron Pillar at Delhi by T.R Anantharaman.
IIM Metal News Vol 7, NO:2 April 2004- R Balasubramaniam.



The most interesting part of this pillar is that it is corrosion free. It can be called 'a rustless wonder'. The extensive research done on chemical analysis concluded that it consists of 99.77% Iron, 0.26% Carbon, 0.026% Silicon, 0.18% Phosphorous, NIL Manganese, 0.003% Sulphur, 0.007% Nitrogen.

Metal Research Committee of the Council of Scientific and Industrial Research (CSIR) encouraged Indian scientists to contribute to this research.

Magic behind the "Rustless Wonder":

Systematic chemical, spectro-chemical, X-ray and mechanical investigations gave the following conclusions:

- The Iron used in this pillar is similar to the iron used elsewhere in India at that time.
- However, the properties of this pillar differ from the others due to very heavy mechanical working.
- The pillar is heterogeneous in structure.
- Composition is comparable to that of modern day low carbon steel.
- This pillar was not cast but fabricated by forging and hammering the lumps of iron balls each ball weighing at least 20-30 Kg.

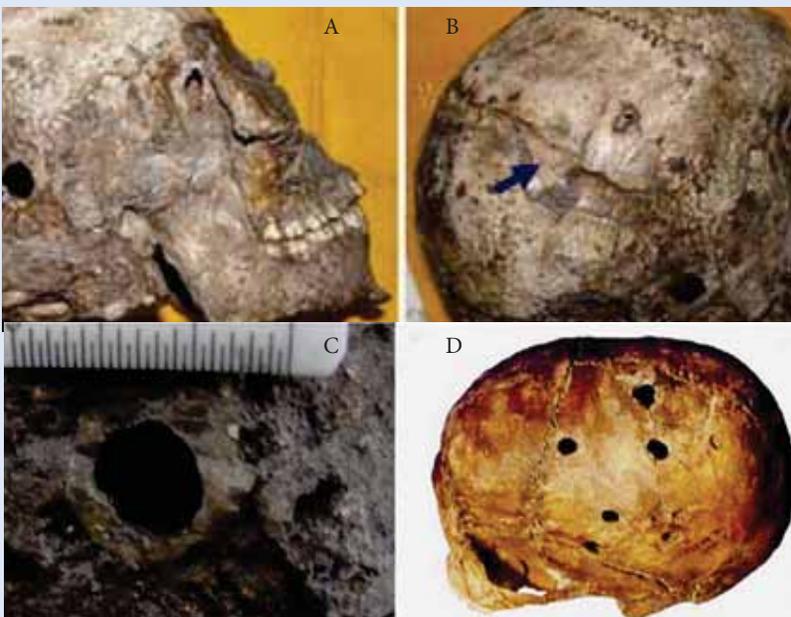
Process of manufacturing:

The iron has never been melted because the heterogeneous nature of this pillar clearly shows that it has never undergone any heat treatment. It must have undergone, in a bloomary furnace, a hammer forging together balls of hot iron and a continuous hammering process to create a smooth surface. During the considerable time needed to complete this process, an oxide film would have formed and been hammered into the surface. Slag too would have been incorporated in the scale. So these oxide film and slag got well into the spongy iron thus preventing it from rusting. However there are other beliefs also suggesting that some kind of oil or lepa (medicinal paste) must have been applied to prevent rusting.

EVIDENCE OF BRAIN SURGERY IN BRONZE AGE HARAPPA

The findings of the anthropological survey of India show that the first case of ancient brain surgical practice known as Trepanation existed 4300 years ago (during the Bronze age) in Harappa. A Neolithic skeleton with multiple-trepanated skull was found in Burzahom in Kashmir valley, while in Lothal, Gujarat, a skull of a child gives the earliest evidence of this type of surgery. The former was a victim who suffered and survived a blow from a strong wooden stick.

Trepanation or Trephination is the oldest surgical procedure in which a hole is drilled in the skull in order to treat health problems related to intracranial diseases.



During those times, it was done to repair skull fracture resulting from blows and to remove splinters and blood clots. Trepanation was also practised to cure certain inter cranial catastrophes, mastoid inflammation, vertigo, neuralgia, coma, delirium, meningitis, convulsions, epilepsy, intracranial tumors, mental diseases and syphilitic lesions.

Fig 1. The trepanated Harappan male skull H-796/B in the Palaeoanthropology Repository of the Anthropological Survey of India, Kolkata in three views: a, the left lateral view showing the trepanated hole; b, the postero-lateral view showing the horizontal linear traumatic fracture on the occipital bone; c, an enlarged view of the trepanated site showing the rim of callous formed due to healing, and d, the trepanated Burzahom female skull showing signs of multiple trepanations

Source: Current Science,
Vol 100, No: 11, 10 June 2011

Mathematics - The Joy of Infinity

The history of the development of mathematics in India is as old as the civilization of its people itself. sacred literature like- the Samhitas, the Kalpasutras and the Vedangas contain enough material to help form a good idea of the mathematical ability during the time of development of this class of literature.

The Sulba Sutras, which form part of Kalpasutras, are a veritable storehouse of information concerning arithmetical operations, fractions, properties of rectilinear figures, irrational numbers and the so-called Pythagorean Theorem.[1]

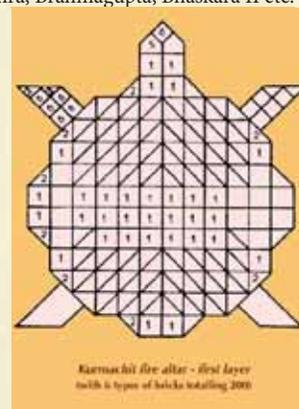
The demands of astronomy, particularly the need for more accurate computations of planetary motions, eclipses, etc. caused Indian mathematics to receive a new lease of life during the first few centuries of the common era.

In India, most of the numbers are from the philosophical and spiritual concepts. For example the 12 adityas, 25 tattvas, 27 nakshatras, 33 devas, 49 vayus. (2) The association of spiritual and philosophical concepts with number names illustrates the absence of rigid boundaries between science & spirituality in the minds of Indian mathematicians.

India has produced a large number of eminent mathematicians like Aryabhatta, Mahavira, Varahamihira, Brahmagupta, Bhaskara II etc. who are the authors of several treatises on mathematics and astronomy.

Major Contributions

- ☒ Aryabhatta in his book Aryabhatiyam approximated the value of π to be 3.1416 which is correct up to five significant figures.
- ☒ Mahavira was a 9th- century Indian Jain mathematician who asserted that the square root of a negative number did not exist. He gave the sum of the series whose terms are squares of an arithmetical progression and empirical rules for area and perimeter of an ellipse.
 - ☒ Brahmagupta gave the solution of the general linear equation in chapter eighteen of Brahmasphutasiddhanta popularly known as the Doctrine of Brahma.
- ☒ Bhaskaracharya's work on calculus pre-dates Newton and Leibnitz by half a millenium. He is particularly known for the discovery of the principles of differential calculus and its application to astronomical problems and computations. One of his major contributions is LEELAVATI, a book on mathematical problems.



Reference:

1. D M Bose & B V Subbarayappa, A Concise History of Science in India, Indian National Science Academy, 2nd ed., 2009.
2. Michel Danino, Indian Culture and India's Future, 2011.

It was definitely an unexpected experience for someone like me, but it is the experience which only the students of Amrita Vishwa Vidyapeetham are fortunate enough to have. During my admission here for MBA many people said “we are blessed” because we are studying under the ‘direct’ care of our Beloved Amma. At that time I did not realize what this meant, being a simple person who was not much into poojas, and who hardly ever visited temples.

During those three months I had observed many people from different parts of the world diligently engaged in all kinds of odd occupations here, irrespective of their position in society, educational qualifications and nationality. Initially, I could not understand why they were doing all this and what they expected to gain out of it. For all of my questions, I found satisfactory answers – justification, more than mere answers – during the four days between September 25th and 28th, the birthday celebrations of Amma. During these days it was exemplified to me what Bliss, Love and Seva was. We, the MBA students divided ourselves into groups and started performing various activities, such as Media, VIP handling, Stall handling etc. I was in the media team. I met many people from various places, backgrounds and cultures. But there was one common aspect that was obvious in everyone. “They feel blessed by Amma”. While interacting with some of them, their experiences with Amma touched my heart and really brought tears to my eyes.

On the day of the birthday, I was flabbergasted by the way Amma gave ‘Darshan’. She was on the stage, giving Darshan for almost 24 continuous hours without food and water, which was too incredible for someone like me and way beyond possible for any ordinary human being. This made me realize how great and distinguishable Amma is!!

A very significant thing happened that afternoon when I went to meet people who had come for receiving the pension amount from Amma. It actually helped in realizing a change in me, before and after joining the Amrita family. I found that eighty percent of them were aged, that is, beyond sixty. I was coordinating them into queues. Some of them addressed me, asking things in Malayalam. Since I’m a native of Andhra Pradesh and do not know Malayalam, we found it difficult to understand each other. I tried to reply to them in Hindi and English, and also with lots of gestures. Noticing this, those women who were in queue for a long time for their pension amount of Rs 330/- started making fun and some, very old, were finding it hard to stand so long in the queue. My friends and I provided chairs for some of them. Some people got frustrated, standing in the queue.

These four magnificent days made me understand and realize Amma’s very valid view on education, which is, “Education is for life, not merely for a living”. I also understood the importance of selfless service. My mind was totally relaxed and filled with utmost satisfaction while I was doing my bit of service for the needy. Hence, I reiterate that these days will always be the most memorable days of my life.

Samskaras

What are Samskaras? Why are they so important in life? Why are they given so much importance in scriptures? All these are questions that generally pop up in our mind whenever we come across this word. Samskaras are certain sacramental rites that are done at different stages of life. In common man’s terms samskaras are nothing but strengthening or refining one’s own character. Not only do these samskaras bring in spiritual success but also intellectual, emotional and physical success as well. For a better understanding of the concept, let us consider a diamond. Diamonds are found encrusted with some far less beautiful rocks. Diamonds need to be purified and properly cut and shaped in order to exhibit their brilliance. Though what you got initially with some crude rock is also diamond, it isn’t valuable. Similarly every man’s life can also be considered as a diamond. We are born in this world with our own limitations, disabilities and tendencies. Our mind, body and soul need to be purified from negative thoughts and external influences in order to shine like a diamond in life. Polishing a diamond is not a one-step process. It requires lots of precise and carefully skilled steps in order to get the various facets highly polished. In the same way, our personality can be refined only through several steps; steps at several stages of life. These refining processes are called samskaras. These rituals balance, mature and temper the mind, thereby making it more cultured. Only through a lifelong process will a person be able to invoke the divine feelings of love, compassion, joy and peace. Scriptures have categorised the qualities of a person into eight. These are referred to as eight Atma Gunas. They are Kshanthi [perseverance], Daya [love for all beings], Anasuya [absence of all sorts of egos and complexes], Soucha [internal

light heartedness], Mangala [auspiciousness], Akarpanya [generosity], and Aspruha [desirelessness]. These eight special virtues lead a person to self realisation.

For a man his ultimate success comes when he attains divine union. For one to attain that requires a tremendous amount of practice and focus. For a man in the 21st century the ultimate aim of life is to remain happy and blissful. He aims to attain good health, long life, prosperity, wisdom and peace. For that, samskaras play a major role. Man’s life is always filled with selfishness, ego, complexes and anger. Nobody is to be blamed, though. That is just the nature of today’s world. However, in this world, if one wishes to attain liberation and live happily, he needs to first try to eradicate such feelings and replace these with the Atma Gunas. No matter how much we meditate or work hard, it doesn’t give us mental satisfaction and liberation until we eliminate the doshas. This process is known as Dosha Apanayanam. Once the doshas are eliminated, aspects of life such as physical and emotional health, intellect and concentration begin to blossom. Vedas and scriptures were written centuries ago for the well-being of society. There is a saying in Hindi “ek gandi machli poore talab ko ganda bana rahi hai”. This means that a dirty fish can make the entire pond dirty. In terms of human life, for the well-being of a society, each and every individual needs to be free from all the above mentioned doshas-Samskaras aim at that. Samskaras nourish family relationships and strengthen society. Though Samskaras are not directly mentioned in the Vedasamhitas, their references are found in Brahmanas, Aranyakas and Upanishads. The most important original source of performing the samskaras is given in Srautasutras especially Grihyasutras and Dharmasutras. Some aspects of samskaras are given in Smritis, Puranas and Itihasas as well. At least forty-five samskaras are presently known to man though not all are performed frequently.

If we consider our lives, we can identify that we practise some samskaras on a regular basis even if the word samskara is not familiar to us. The primary components of samskaras are namely Agni, Water, Symbolism, Worship, Orientation, Discipline, Chanting mantras and Astrological Divinations. Agni or fire is a primary element of any auspicious event. Water, which is an elixir of life is also worshipped and considered heavenly and so is used to clean any offering given to God. Symbolism is certain mudras or symbols like ‘om’ or the swastika that contain certain meanings. Worship is what people do every day in front of their own Deities. This induces positive vibrations within a body that purify the person. For every task we perform, we opt for a particular direction, for example vaasthu shastra. Directions have lots of scientific implications and wrong directions generally prove to be hazardous. Similarly, astrological interpretations are considered before holding any sort of auspicious event. Chanting mantras is also part of the daily routine of every Indian. The belief in an omnipotent power is a source of confidence for life. The most important samskara is- the basis for success for a man, which is discipline. Without discipline, no living being has excelled in life. Samskaras are often performed at the beginning of a new stage of life. The significance of this can be explained with an analogy. An archer aims at his target before launching the arrow. Similarly, Samskaras direct each stage of life at its origin and then launch that phase of life towards the greatest mental, physical, emotional, intellectual and spiritual progress so that the hurdles to be overcome are reduced.

The Wonder That is Sanskrit

Sanskrit is one of the most ancient languages. It has the largest literature of any language, along with the sacred literature of two religions- Hinduism and Buddhism. It has extensive literature of poetry, drama, philosophy, spirituality, metaphysics and mythology though parts of it have been lost through time. It is thus a paradox that Sanskrit is known so little around the world, and, even in the land of its origin, India, the language is understood and spoken only by a minority. We must therefore try to understand why it has receded into the background and realize its importance and the role it can play in India's resurgence and future development. Sanskrit, in a sense, has to be rediscovered.

The very word 'Sanskrit' means - that which is well structured and has been refined to the utmost. Sanskrit is perhaps one of the very few languages that has a vast amount of technical literature on grammar and related topics.

In Sanskrit, there is a whole body of literature that is based on play with the language, of the nature of 'linguistic acrobatics'. These writings require great mastery over complex grammatical structures and demonstrate the amazing possibilities inherent in the language. There are examples of Slokas written with certain constraints on the use of consonants and others with constraints on the usage of vowels. For example there is a full fledged sloka with all thirty three consonants in Sanskrit appearing in their natural order! There are other examples of slokas where the entire two lines are written using just two or three consonants. (Try writing at least one small meaningful sentence in English using only two or three letters of the alphabet repeatedly, and you will appreciate this all the more!) Here is an unbelievable sloka of 32 syllables that uses only one consonant-च and one vowel-आ in the entire verse.

यायायायायायायायायायायायायायायाया
यायायायायायायायायायायायायायायाया॥

Although at a first glance, the sloka may appear to be meaningless, the proper prose order of the verse is given by- यायाया(yayya), आया(aya), आयाय(ayaya), अयाय(ayaya), अयाय(ayaya), अयाय(ayaya), अयाय(ayaya), अयाया(ayaya), यायाय(yayya), आयाया(ayaya), आयाया(ayaya), या(ya), या(ya), या(ya), या(ya), या(ya), या(ya), या(ya), या(ya) and the

meaning of the verse is as follows:-

The sandals which adorn the Lord, which help in attainment of all that is good and auspicious, which give knowledge, which cause the desire, which remove all that is hostile, which have attained the Lord, which are used for going and coming from one place to another, by which all places of the world can be reached, these sandals are for Lord Vishnu.

Amazing, isn't it?

Then there are slokas called 'Gaticitras' that are variations of what are known as palindromes in English. In some slokas, the entire verse forms a palindrome; in some each line is a palindrome. The following is an example of a beautiful sloka, where every quarter stanza is a palindrome-

देवाकानिनि कावादे वाहिकास्वस्वकाहिवा।
काकारभभरेऽकाका निस्वभव्यव्यभस्वनि॥

and it means: O man who desires war! This is that battlefield which excites even the gods, where the battle is not of words. Here people fight and stake their lives not for themselves but for others. This field is full of herds of maddened elephants. Here those who are eager for battle and even those who are not eager have to fight.

There is yet another exceptionally beautiful verse based on a well-known problem in Mathematics where the challenge is to place a knight in one corner of the chessboard and to cover all 64 squares with the knight, without landing on any square twice. French mathematician, Euler was the first to come up with a solution for it, and it is hence termed the Euler's Chess and Knight problem. In India, a manuscript called Padukasahasram has been found, written by a Tamil saint Shri Desikan that contains the verses given below. The syllables of the first verse are written out in the squares of a chessboard

स्थिरागसां सदाराध्या विहताकततामता ।
सत्पादुके सरासा मा रङ्गराजपदं नय ॥²¹

Meaning: O sacred sandals of the Brahman, you are always adored by those who have committed unpardonable sins; you remove all that is sorrowful and unwanted; you create a musical sound; (be pleased) and lead me to the feet of Lord Rangaraja (Rama).

Beginning with the first syllable, if the second sloka is read among the letters of the first sloka, it can be observed that the letters follow the movement of the knight on the chessboard, giving simultaneously a solution to the Chess and knight problem.

स्थि	रा	ग	सां	स	दा	रा	ध्या
1	30	9	20	3	24	11	26
वि	ह	ता	क	त	ता	म	ता
16	19	2	29	10	27	4	23
स	त्पा	दु	के	स	रा	सा	मा
31	8	17	14	21	6	25	12
रं	ग	रा	ज	प	द	त्र	य
18	15	32	7	28	13	22	5

स्थिता समयराजत्पागतरा मादके गवि ।
दुरंहसां सन्नतादा साध्यातापकरासरा ॥

Meaning: The sandals which protect those who shine by their right attitude, whose place is in the centre of the blissful rays, which destroy the melancholy of the distressed, whose radiance brings peace to those who take refuge in them, which move everywhere - may those golden and radiating sandals of the Brahman lead me to the feet of Lord Rangaraja.

What is amazing is that these verses were written roughly 700 years before Euler! Also notice that both verses are perfectly meaningful and appear one after the other in the Padukasahasram.

These are just a few examples of the ingenuity and versatility of the writers in the language and the immense possibilities and subtleties of the Sanskrit language. Acknowledged by Sir William Jones as being "more perfect than Greek, more copious than Latin and more exquisitely refined than either", Sanskrit is indeed the greatest treasure India possesses and occupies the pride of place in our cultural life.

Source: "The wonder that is sanskrit" by Sampad and Vijay, Sri Aurobindo Society, Pondicherry.

HOLY COW – ACCLAIMED ABROAD, DESPISED AT HOME

For years we were made to believe that Indian cows are unproductive. They give less milk and therefore are a drain on farming. The entire focus has therefore been to crossbreed with the exotic high-yielding milk cattle from abroad.

For a nation, which has rarely been proud of its natural assets, expecting the holy cows to be scientifically and technically revered was certainly out of question. While India refused to acknowledge the distinct and superior traits of its indigenous cattle breeds, and in fact derided all efforts to develop the production potential of its own local cattle breeds, another developing country saw the virtues of the Indian cattle breeds and has over the years emerged as the major supplier of semen and embryos of high-yielding milk cattle breeds. These improved cattle breeds actually originated from India.

It was in the 1960s that Brazil imported three cattle breeds from India – Gir and Kankrej from Gujarat, and Ongole from Andhra Pradesh. These were essentially imported for beefing up its meat exports. It was only when these breeds landed in Brazil that they found them to be also a good source for milk production. In a recent FAO publication on traditional knowledge, it has been observed that what was (and is still) considered a ‘waste’ in India, has turned out to be a great economic wealth for Brazil.

Brazil has in recent years emerged as the world’s biggest supplier of improved cattle embryos and semen of Indian origin – now rated amongst the best dairy breeds in the world. The demand for Indian breeds is particularly high from the African and Southeast Asian countries. Suitable for the tropical conditions, these countries find the improved cattle germplasm to be ideal for their cattle breeding programmes. If only Indian dairy and animal scientists had not ignored the domestic cattle breeds, the fate of the Indian cows would have been much different – these holy cows would have then been truly revered.

Believe it or not, the world’s best Gir cows today give 5500 litres of milk on an average per lactation. Compare these with the neglected cousin back home, which do not yield more than 980 litres, the Brazilian Gir yield roughly six times more. And that’s not the maximum limit, milk yields as high as 9000 litres per lactation have been recorded in Brazil. Imagine the Indian Gir breed giving that much of



milk. The fate of the Indian cattle would have undergone a dramatic change for the better.

In India, where agriculture research and education has been more or less westernised after the advent of the land grant system of education, agriculture scientists considered it worthless to work on the native breeds. Cattle improvement realised on the sole methodology of bringing in alien breeds of Jersey and Holstein-Friesian and using them in a nation-wide crossbreeding programme to improve the domestic milk production capacity.

The imported Jersey purebreds, which were used extensively for improving milk production in Indian breeds, on an average produce 3,000 to 5,000 litres in a lactation year. On the other hand, the resulting Jersey crossbreds that were born do not give more than 2500 to 3000 litres. Imagine if the country has instead gone in for developing its own indigenous breeds yielding almost double than the crossbreds, India’s milk production would have surpassed all global records.

Indiscriminate crossbreeding of Indian cattle with the exotic breeds under the Intensive Cattle Breeding Programme (ICBP) has already rendered more than 80 per cent of the Indian cattle in the non-descript category. In a country, which has the largest population of cattle in the world, and some 30 recognised breeds of cattle, genetic contamination had taken its toll. More than a dozen of the Indian cattle breeds have almost disappeared.

So much so that some years back, Oman made an unusual request to India. The oil-rich Middle East country was looking for four purebred animals of the cattle breed – Tharparkar — found only in the dry and arid regions of Rajasthan. Tharparkar derives its name from its unique genetic ability that enables the animal

to walk across the massive desert of Thar in Rajasthan. It took us several years to procure four genetically pure Tharparkar bulls.

While India ignored the strength and capabilities of its domestic cattle, Brazil realised the unique genetic potential of Indian breeds. It has meanwhile developed a number of commercially important crossbreds: Girolando, a dual purpose cattle for beef and milk and Zeboain, developed from crossing Kankrej and Ongol. A breed evolved for meat, and currently being developed for milk is Nellore. Another breed Indo-Gujarat is a genetic mixture.

In Minas province, a research company, EPAMIG, has produced 50 dairy cows recording 10,000 litres per 307 days of milk period. These high-yielding cows are being used for embryo collection, fetching US \$ 220 per embryo. Semen from the progeny bulls of this breed fetches US \$ 11 a dose.

Not only in Brazil, animal genetic wealth from India has been the building block of numerous improved breeds all over the world. Take poultry, a rare Indian breed – Brahma — is among the parents of modern broilers. The development of Anglo-Nubian breeds of goat in Europe is traced back to Jamnapari breed from India. In the case of buffaloes, some of the best breeds available world over are from India.

And yet, India has been regularly sending official missions to scout for improved breeds of sheep, horses, rabbits, poultry – you name it. The accepted logic being that India’s own domestic breeds are unproductive and importing exotic breeds is the only practical way to improve productivity. The same reasoning also extends to plant varieties and the traditional medicinal systems. While the production potential of high-yielding crop varieties is often exaggerated, there is not even a single official research programme to identify and improve the traditional and locally adaptable crop varieties.

It is primarily because of our inability to appreciate the genetic wealth existing in our backyard that much of it has already been taken and deposited in the plant and animal repositories in Europe, United States, Japan and Australia.

-By Devinder Sharma,
Chairperson, Forum for Biotechnology
& Food Security, New Delhi.

Takshashila-The First Ever University

In this modern era, information of any kind is available at our fingertips and students can improvise their knowledge in any specific field of interest by enrolling themselves into one of the well-established colleges. Technology is so advanced that students need not even go to institutions for higher education. Can you imagine a time when students had to travel miles and miles to pursue education? In the pre-mechanical ages, travelling was not easy or quick, and parents considered themselves fortunate if they could live to see their sons come back home after completing their education.

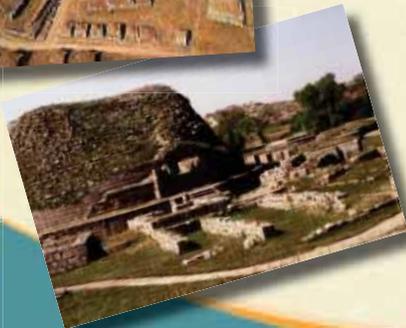


Takshashila or Taxila was one of the ancient universities in India and was recognized as the intellectual capital of India. Its period of existence was demarcated from 1000 B.C.E to 500 C.E, and was the first university in the world. It attracted scholars from different and distant parts of India. Students poured in from places far-off Benares, like Rajagaha, Mithila, Ujjeni, Kosala and many more. The students are always spoken of as going to Taxila to “complete” their education and not to begin it. The name of the place was a tribute to Taksha, founder of the city of Takshashila. It was sited twenty miles to the west of Rawalpindi. Students who came to Taxila were mostly between the age group of sixteen and twenty. This shows that Taxila was a seat of higher education. The place offered a wide variety of courses; both in literary and technical fields, commonly known as Vedas and Silpas. Rigveda, Yajurveda, and Samaveda were taught under the course of Vedas. The fourth Veda, Atharvaveda was dropped out from the list for unknown reasons. The studies of six auxiliary sciences were also a vital part of Vedas. These included the science of correct pronunciation, Aphoristic literature; guiding the performance of various rites and sacrifices, Grammar, Astronomy, Prosody and Etymology. Silpas were eighteen in number and included subjects like craft or vocation based on practical skill as contrasted with religious and literary subjects. Conveyance or law, Mathematics, Accountancy, Agriculture, Commerce, cattle breeding, divination, snake charming, spell for bringing back the dead to life, hunting, archery, art of prognostication, medicine etc. were also taught. Apart from theory, practical sessions were also made mandatory in the curriculum. This aided in the better understanding of subjects.

Taxila comprised a number of special schools. This included schools of Medicine, Law, and Military science. One of its military schools had all the then princes throughout India numbering one hundred and three as students. Thus the teachers of Taxila were as famous for their knowledge of the arts of peace as for that of war. Taxila's accomplishments as a university can be mainly credited to the teachers. They were always spoken of as “world renowned”, being authorities, specialists and experts in the subjects they professed. Discipline was a must at Taxila. The standing duty of a student was to gather firewood in the forests. They were not even allowed to go to a river for a bath except in the company of a teacher. The college seems to have had a number of sittings every day. Instructions were imparted at times convenient to the students. The entire tuition fee had to be paid by the student in advance. This fixed sum seems to have been a thousand pieces of money. If the student did not have enough money to pay for the education at Taxila, they could compensate for it by doing services for their teacher. This particular class of students did their services during the day and received classes at night.

The state awarded scholarships to some poor students for their education. It is to be noted that the fees paid by the students did not go as salary to the teachers. It was to cover the lodging and other necessities of the students who resided with their teachers under a common roof. Day scholars were also permitted at the university. Students from all castes except the Chandalas, were permitted at Taxila. Apparently, the students of a particular caste did not always confine themselves to their traditional subjects of study. They always had freedom of choice regarding their studies at the university. The senior students often helped their masters as assistant masters. It was only the most senior pupils that were appointed as Assistant Masters. The students were given the simplest food. A very interesting matter to note is the involvement of birds in the life of students at the university. The crowing cock helped in waking the students from their sleep in the morning and the Tittiri birds were trained to recite Vedic mantras which helped the students in their recitation.

The students on completing their course gave Dakshina to their teacher. This could be anything and was considered as a tribute to the ‘guru’. With great pride we can say that our most revered scholars of the past, Chanakya, Panini and Jivaka were students of Taxila. It is known to all that Panini was one of the greatest grammarians of the Sanskrit language. Chanakya also known as Kautilya was the brave minister of Chandra Gupta Maurya and Jivaka was a famous physician who was an expert in the field of medicine.



It was the presence of scholars of acknowledged authority and widespread reputation that made Takshashila stand out from the rest of the universities at that time. Thus the numerous learning centres in different parts of the country became affiliated to the educational centre of Taxila which exercised an intellectual suzerainty over the wide world of letters in India. In the middle of fifth century C.E, when the Hunas attacked the place, this resplendent seat of learning was fully destroyed. The attack on the city thus ended a most significant chronicle of education in the history of India.

Source: Ancient Indian Education
– Dr Radha Kumud Mookerji.

THE SANSKRIT DRAMA LEGACY: KOOTIYATTAM

Expressions make life amicable. Art forms provide vistas of expression and it is always inspiring to take a long meandering drive through India's artforms galore. As Tagore said, the 'unity in diversity' of India is commendable here also. From Kashmir to Kanyakumari each and every state has in store, a variety of art forms derived from their heritage and culture. Let us learn about "Kootiyattam" of Kerala, which lies in the south western tip of India.

Kootiyattam is said to be the most ancient and ritualistic art form of Kerala. All the text and protocols are deduced from Sanskrit texts. This is indeed the oldest, living theatrical tradition in India. An Introduction of Kootiyattam as given in "Glimpses of Kerala Culture" written by Princess Aswathi Thirunal Gouri Lakshmi Bayi is as follows: "The auditorium is decorated with Banana bunches and golden coconuts; the lamp with its three wicks is already lit. Prayers over, the Nambiar plays Mizhavu to the time beat of the Nangyar's cymbals. This orchestra episode known as 'Goshti' is an invocation for a successful staging. Next is the entry of Sootradhara, the formal announcer, who purifies the stage by sprinkling holy water on it. The curtain is now held up near the oil lamp. As the drums resound once more, now behind the curtain, the principal character of the evening's drama executes the invocatory ritual dance and withdraws to the green room. The Sootradhara re-enters the stage as it is he who announces the play. The Nangyar sings a few verses ending with a prayer to Lord Siva, followed by one in praise of the Goddess while the Sootradhara dances to both. Thenceforth the Chaakyar executes some steps while describing Siva and Parvathi, the celestial couple, to conclude with a prayer to the divine universal creation encompassing Heaven, Earth and Hell. As the dance draws to an end, the Chaakyar in the role of Sootradhara prostrates on the stage and exits. He does not make further appearance since his role in the drama is now over. All these are collectively termed 'Poorvaanga' or the initial act is an abridged version of the same which is elaborated in the "Naatyasastra". The art form of Kootiyattam traces back two millennia and can find its basis in plays written by Bhasa, Sreeharsha, Saktibhadra, Kulasekara, Neelakanta, Bodhaayana and Mahendravikrama Pallava. Due to the difficulties in choreographic treatment, Kalidasa's and Bhavabhuti's works were excluded. As of now, there is no information regarding when and where the first play was staged. Kootiyattam holds the record for being the one and only art form that is still following the Sanskrit tradition of performing arts. Kootiyattam in Sanskrit means group play [kooti-group, attam-play].

attributed variously to the second, third and sixth century C.E has reference to this art form. The epic describes the performance of a chaakyar from the region of Paravoor, 25kms away from the Ernakulam city.

Kootiyattam strictly follows Sanskrit as a medium for expression. Profound knowledge in Sanskrit became a must for appreciating the performance. Hence the elite and learned group of people became the prominent audience for Kootiyattam. Chaakyars and Nambiar, two groups belonging to temple society jealously guarded this art form. Chaakyars were the actors, whereas Nambiar did the stage management and played

Mizhavu, [a musical instrument] which is an important element for performance. Nangiyar or Nangiyarammas, the womenfolk of the former group played cymbals and sang whenever required. They also enacted the female roles.



THE UN CANDIDATURE MATERIAL: "Essentially Kootiyattam is a theatre operating entirely through the imaginative sharing between the actor and the audience as it constantly redefines the roles and relationships of the dramatist to the actor, actor to the character and to the spectator."

The actors have complete freedom to improvise. The theatrical technique of "Pakarnattam" is at its pinnacle here. [Pakarnattam refers to the enactment of other roles with ease and without changing the costume]. In Kootiyattam, in contrast to kathakali, actors speak and perform. The male artists converse in Sanskrit whereas the female artists use Prakrit, a crude form of Sanskrit. The performance is usually done in "Koothambalams". Koothambalam is the ambalam or temple for performing "Koothu". Sri M.K.K. Nair commented on Koothambalam as "a perfect piece of acoustic excellence", in his book "Classical arts of Kerala". Valiambalam, the inner quadrangle of the temple, is the substitute for the temples which do not have a Koothambalam within the temple premises. The acting techniques of kootiyattam are confidential in nature. The codes of dramatic presentation are complex, difficult and long-drawn out. The two major texts which

are considered as the soul of Kootiyattam are "Attaprakaram" and "Karmadeepika". Usually these texts are handed down from generation to generation, from guru to shishya, invariably both from the same family. These Granthas or palm leaf manuscripts were preserved in famous chaakyar homesteads like Painkulam, Ammanur, Maani, Kitengur and pothiyil. Karmadeepika deals with the practical aspects such as stage arrangement, production, costumes, wages paid etc. Attaprakaram as the name suggests gives clarity on how to perform. This great book delves deep into the gestural movements, elaboration of expressions and other aspects of performance.

The instrumental music support is a key element for performing Kootiyattam. Mizhavu is the most important instrument that produces the time beats and rhythm for this sacred art. Two Mizhavus are used when required. Kurumkuzhal, a piped wind instrument is also used. Now a days its prominence is much less and Timila, a hand played drum, is often used. A small pair of cymbals known as Kuzhithalam is played by Nangiyaramma to keep time. Edakka a small drum slung over the shoulder and played with one stick, gives excellent sound support to the actor. The holy Sanku or Conch is blown at the commencement and conclusion of the performance.

A plain oil lamp is lit with three wicks throughout the performance. These three wicks represent the Trinity- Brahma, Vishnu and Siva. It is believed that God, Goddesses and Sages view the performance as audience. Hence it is only during Kootiyattam performance that the Sreekoil (sanctum) doors are kept open, so that the Diety can watch the performance. This indeed proves the sanctity of Kootiyattam.

From the plethora of Kerala's artforms, Kootiyattam won international appreciation with UNESCO recognition. This Sanskrit theatre tradition of Kerala, has been declared as the 'Masterpiece of the Oral and Intangible Heritage of Humanity' by UNESCO. It is for the first time that UNESCO has selected art forms from across the world to bestow recognition as part of its effort to safeguard expressions of oral heritage and traditional culture. Sangeet Natak Academy, New Delhi and UNESCO Japan give financial support and work for the popularity of Kootiyattam. Kootiyattam is widely known for its stylised performance. May the journey continue in the long run.

THE UN CANDIDATURE MATERIAL: "Essentially Kootiyattam is a theatre operating entirely through the imaginative sharing between the actor and the audience as it constantly redefines the roles and relationships of the dramatist to the actor, actor to the character and to the spectator."

Source: Glimpses of Kerala Culture
- Princess Aswathi Thirunal Gouri Lakshmi Bai.

A Tour to Hampi, Et al.

Truly said by Romain Rolland, "if there is one place on the face of earth where all the dreams of living men have found a home from the very earliest days when man began the dream of existence, it is India." It is not an exaggeration, but a real truth buried deep inside the earth. In an attempt to explore this truth, the team of SFIH (Students Forum for Indian Heritage) started their journey to the world heritage site, Hampi and its nearby places in Karnataka.

Hampi is more than a tourist place. The wonderful stone carvings and monuments are the major attractions. Each of the sculptures has its own historical importance. Most of the carvings are of Indian Gods and Epics which depict the greatness of the rich culture and religion of our country. The places at Hampi symbolise the technological wonders, artistic skills and architectural expertise in India during the early ages.



The team started their tour from the Vithala temple. This temple which was built in the 15th century, has a typical South Indian temple layout – a compound wall around a massive courtyard, an entrance through a majestic gopuram and an ornate central shrine surrounded by several mandapas. The entire temple complex is a feast for the eyes and the most astonishing spots at the temple are the shrine shaped like a chariot and the profusely carved pillars, which surprisingly, have something in store for the ears.

The intricately carved shrine is situated on top of a wheel carriage. The carriage with axles and brakes is wonderfully detailed. Notice how disproportionate the elephants pulling the chariot are? They belong elsewhere. They were placed here by some smart modern match maker to complete the picture. The chariot originally had horses whose hind legs can be discerned just behind the elephants' posterior. This chariot is the most extravagant architectural showpiece of Hampi.

The temple is famous not only for the stone carvings but also for the musical pillars. The indexed musical pillars, when tapped, emanate sonorous musical notes. The speciality of these pillars is that the musicians carved on the statues produce the sound of the instrument they play when the pillar is tapped. The three pillars show dhol, damaru and tasha respectively.

The next destination of the tour was Chennakeshwara temple at Belur. The team was all set to explore the rich History of Hampi and arrived at the site of the temple at Belur and were thrilled by the Hoysala Emblems and the cynosure of the Gravity Pillar. The speciality of this pillar is that it stands on its own without any foundation. This depicts the Ancient Indians' mastery over architecture.



The guide gave an enthralling account of the origin of Hoysala dynasty. The epic says that a small boy named Sala was studying in a Gurukul. One day, a Lion burst into the temple near the Gurukula, where all the students were meditating. All the students except Sala, ran in fright. His Guru astounded by his student's bravery gave him a call "Hoy.....Sala" and threw him a sword to fight against that Lion. Sala, first pierced the sword into the Lion's ear and

next right into its mouth which killed the lion. Thus came the name Hoysala and its two emblems. On hearing this, a feeling of pride filled our hearts, looking at those marvels. But at the same time, a feeling of sadness pierced us as we were reminded of our great buried history.

The last destination of the trip was the Halebidu temple which is akin to the Belur temple. This Hoysaleshwara temple at Halebidu is dedicated to Lord Shiva. It was built during the Hoysala Empire rule in the 12th century by King Vishnuvardhana. The construction was completed in 1121 CE. During the early 14th century, Halebidu was sacked and looted by Muslim invaders from Northern India and the temple fell into a state of ruin and neglect. An interesting object in the temple complex is the rare Garuda Sthamba (Garuda pillar). Garudas were elite bodyguards of the kings and queens. They moved and lived with the royal family and their only purpose was to protect their master. Upon the death of their master, they committed suicide. The rare pillar on the south side depicts heroes brandishing knives and cutting their own heads. The inscription honours Kuruva Lakshma, a bodyguard of Veera Ballala II who took his life after the death of his master.

The visit to Hampi filled everyone's heart with a sense of pride and respect for the rich heritage, proficient artistry and architectural expertise but at the same time, a bit of regret remained as this rich history is still unknown to many and is revered by few.



DEGREES ALONE ARE NOT ENOUGH... - Radhakrishnan Pillai

(This Article will explore the relevance and application of Principles and Strategies discussed in the 3rd Century BC treatise, Kautilya's Arthashastra, in Today's Corporate World)

A friend of mine who heads the HR department at a leading retail company once said, "I am frustrated with the quality of students that come to us!"

For me – as a person who believes in the potential of management students – this came as a surprise. But on further questioning, I found myself supporting this person's statement!

Most students from B-Schools come with MBA degrees. But none of them have any practical idea of the corporate world. Chanakya had said,

"One conversant with the science, but not experienced in practical affairs, would come to grief in carrying out undertakings" (1.8.25)

With over a thousand management institutes across India, the 'quantity' of management graduates is increasing. But management gurus and thinkers are not convinced of the 'quality'. The science of management is good when it comes to theory but all that we learn has to be effectively practiced as well.

We can tackle this situation by targeting the different levels of education and vocation. Here are some tips for the same:

1. FOR MANAGEMENT STUDENTS...

Management students, or those studying in B-Schools, should not look for degrees and jobs only. They should be life-long learners. Even while studying their course, they should go the extra mile to increase their practical knowledge. They should meet people from the industry, do a self learning through the internet and maintain a record of their learning. It is important to maintain the 'reading' habit even after getting a degree and a job.

2. MANAGEMENT SCHOOLS...

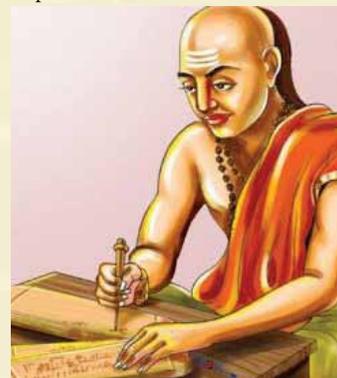
The Directors and the Professors of the management institutes should be updated with the latest problems of various industries. They should spend enough time to understand an industry's specific needs. This should be passed on to the students and practical solutions should be worked out. Industry experts should also be on the board of management institutes.

3. INDUSTRY...

The challenges of every industry are increasing and changing day by day. Industries like telecom, retail, finance, tourism and others – through their respective associations - should make a list of the key result areas (KRAs) that they expect from their new managers. It is important to communicate the same to the management institutes so that the students are trained accordingly.

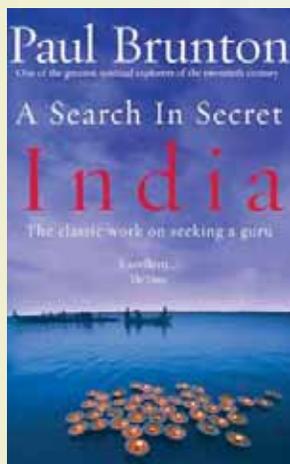
4. INDIVIDUAL COMPANIES...

When the new recruits fresh out of a B-School join an organisation, the management should acquaint them with the realities of the corporate world. They should mentor them by deputing a senior. This is not to say that the industries should be blind to the recruit's theories. Rather, after accepting and absorbing these, the industries should provide the student with insights into the practical aspects. Remember, the road between theory and practice can only be shortened by deeper understanding and open communication. Each individual has to take the initiative to learn the know-how of the world by keen observation, open mindedness and a will to take up higher responsibilities.



Book Review:

A Search in Secret India



Paul Brunton's *A Search in Secret India*, is one of the greatest travelogues I've ever read in my life. It's a classic work on Brunton's search across India for yogis. The book starts by Brunton's justification on his title as "it tells the story of an India which has been hidden from the prying eyes for thousands of years, which has kept itself so exclusive that today only its rapidly disappearing remnants are left". It gives a vivid picture of what India was during the pre-independence time. Brunton was a British journalist and a Spiritual explorer who believed in facts and figures. He is not a blind believer and he keeps on questioning the mysterious things that he comes across till a proper answer is obtained.

He starts from London to Bombay in search of a Guru who can provide him with peace and tranquility that comes from self-knowledge. On his way he comes across a lot of yogis, fakirs and holy men among whom some were fake. His inquisitive mind always wandered for scientific explanations and justifications behind the theories proposed by the holy men. His effort in documenting his inferences and findings has really made his work authentic for any reference. Being a British journalist, he uses a language that effectively describes the greatness of India in its true sense. The flow of his expressions is so beautiful that you keep on reading even if it is a spiritual travelogue. He uses anecdotal style in order to explain the concepts and theories effectively. Some of them have a touch of humor as well.

The book contains many interesting facts about advanced yoga that lets you live without breathing. Whatever we call as involuntary can be made voluntary by practising certain combinations of posture, breathing and will power exercise. These are so difficult that no ordinary man can easily attain it. But it is a truth that such techniques are there that can even make your heart stop beating without killing you. Since this book contains such facts that we have seen only in super-hero movies and cartoons, it doesn't let you take your eyes off the book.

The most interesting part of all in the book is his meeting with the Paramacharya in Kanchi and the experiences with Ramana Maharishi. These are well narrated and play a pivotal role in the success of the book.

Can you believe a person living up to 400 years? How is it possible? The world record of the maximum life span of a human being is just 122 years. Such thoughts keep popping up in our mind as you read it. You may find it absurd; but it is a fact that such techniques existed in India. There are many such facts given in the book of which many are scientifically proven while some are yet to be proved.

This book is a proof of what our ancestors have told us about India. We the youth do not believe in anything until and unless we really feel so. This book gave me a feel of thrill and made me proud of being an Indian. For those of you who wish to know how India stands apart from other countries, this book is the ideal choice.

Balagovind N K Kartha(S4 ME).

The Joy of Experiencing Our Culture...



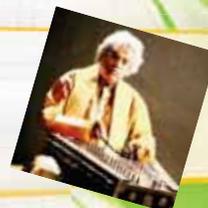
Ottan thullal (A Kerala Temple art form): Conducted by Kalamandalam Mohana Krishnan on 2nd August 2011 at Amritapuri Campus in relation with Ramayana Saparya. Born in a musical family, he obtained lessons in Carnatic Music from his grandmother, Late Parvathy Poduvalsiar. He joined Viswa Bharathi University (Sangeeth Bhavan) as an Asst. Lecturer in Kathakali Music. Mohan is one of the rare artists who could render stage performances as main/supporting singer, together with all the top graded artists in the Kathakali field.

Manipuri Dance: Performed by Padmashri Darshana Jhaveri and her team on September 19th 2011. The story of Lord Krishna and Radha was presented before the audience in all its essence without losing the art value. She is a classical Manipuri Dancer, Research scholar, and a renowned Teacher. Padmasree Darshana Jhaveri is one among the four internationally renowned Jhaveri Sisters, whose name has become synonymous with Manipuri Dance. The creative contribution of Jhaveri Sisters and Guru Bipin Singh has been in bringing the traditional and classical dances of Manipur from the temples to the theatre without tarnishing its original form and spirit.



Samskruti Kalasahiti in association with Kutiyattam Kendra, Thiruvananthapuram organized an interactive session on Kutiyattam for better appreciation led by Guru Padmasree PK Narayanan Nambiar with a focus on the play Subhadra Dhananjayam followed by its performance by Mani Madhava Chakyar Smaraka Gurukulam on March 1st 2012. Director of Kudiyyattam Kendra Sri Gopalakrishnanji provided a scene to scene explanation which made the performance easy to enjoy for the audience. There was also an exhibition and demonstration of Kutiyattam costumes near the venue.

Santoor: Amritapuri campus had the privilege of hosting a Santoor performance by the maestro Pandit. Tarun Bhattacharya on 14th Feb 2012. Pandit Tarun Bhattacharya is the inventor of "Mankas" or fine tuners that help in the tuning of this 100 stringed instrument within a short time, with a long lasting effect and a very high degree of accuracy. In fact, he is responsible for revolutionizing the Santoor instrument.



Classical Guitar and Vocal Music: On 10th of January 2012, Amritapuri campus witnessed the magnificent performance of Dr Kamala Shanker, a renowned exponent of Indian Classical Guitar and Vocal Music. She has attracted worldwide attention by successfully converting the Western Hawaiian Guitar into Shankar-Guitar which has overtones of classical Veena unlike its Western counterpart. She has created an innovative design and shape for this guitar by adding more strings and sympathetic strings to get the sustained, sliding notes common to the vocal style of Indian classical music. The instrument is now a hybrid of a classical Hawaiian guitar and a classical Indian sitar.

Vijay Menon, an Eminent Management Consultant, Faculty of I.I.M., addressed the MBA students at ASB, Amritapuri, and spoke about the greatness of the rich heritage of India. He described the metallurgy behind the Iron Pillar at Qutb Complex, Delhi which has withstood corrosion for the last 1600 years. He said "This Pillar was built at the time of Chandragupta Vikramaditya (375-413 C.E) of the Gupta Empire and is a testament to the skill of ancient Indian blacksmiths and the rich knowledge of Ancient Indians regarding chemistry but the world calls 'Jabir ibn Hayyan (Geber)' as the Father of Chemistry".



Dr. Soumya Sivakumar, Asst. Professor of Marketing and Director, BBA Program at Marymount University US, who addressed MBA students at ASB, Amritapuri spoke about 'Hair of the head as a symbol of faith and spirituality' through the principles of electromagnets. The strength of an electromagnet increases with the increase in number of coils around the core. Similarly, in human beings apart from nine visible inlets/outlets, there is a 10th inlet located in the head known as the Dasam Dwar which is invisible. This is where we experience the reality of God. Hairs are like coils of wire which amplify spiritual energy at the 10th inlet. A greater quantity of head hair will lead to more coils in the (Joora) knot and therefore a higher concentration of spiritual energy. Hair is essentially a spiritual technology that makes it easier to connect with God, hence it should be welcomed and not cut.

As a part of Ramayana month celebrations, Amritapuri campus arranged a talk on Characters of Ramayana and their Importance by the living legend Prof Madusoodanan Nair. Prof Madusoodanan Nair is well versed in Malayalam, English, Hindi, Sanskrit and Tamil. He has bagged many awards including Sahitya Academy award for poetry in the year 1992. Prof Madusoodanan Nair is also known as "Janakiya Kavi" or people's poet.



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Mahabharata War: History or a Myth?



Whenever we dig deep into our history, we often end up in our great Itihasas, Mahabharata and Ramayana. But we are unaware and never cared much about the time in our line of history when all this happened. If we have a precise idea about the date, it would have been possible for us to determine the time of the events that happened before and after the Mahabharata war which have both historical and cultural importance. Many researches on the date were done on the basis of different methodologies such as linguistics, archaeology, astronomy, puranic genealogies, etc. which account for the variation in the determination of the date. Certain Planetarium Software has been made available commercially which allows several authors to analyze the view of sky and place on the world between 4713 B.C.E to C.E 9999 with respect to astronomical references in Vedic texts and in Mahabharata. There are more than 150 astronomical references that are scattered throughout the eighteen Parvas of the epic of which the references are concentrated in Udyoga and Bhishma Parvas.

In the recent past we had a talk on this issue by Prof. Narahari Acharya in which he revealed his calculation of the date of the Mahabharata war with the help of these Planetarium Softwares.

ASTRONOMICAL REFERENCES OF UDYOGA PARVA

This Parva begins with the departure of Lord Krishna to Hastinapura for a diplomatic mission for peace. It has been described that he leaves Upaplavya-nagara for Hastinapura on the day of Revati nakshatra in the maitri muhurtta in the month of Kartika which reveals that it is only a couple of days before the full moon of Kartika, which happens when the moon is near Kartika nakshatra.

It is written in this Parva that it was a Kartika full moon, lunar eclipse night – the night between Krishna's halt at Varkasthala and journey to Hastinapura. While leaving Hastinapura on the day of Uttaraphalguni, Krishna and Karna had a long conversation in which Krishna sends a message to Bhishma and others about the Amavasya that falls on the seventh day from then and that the war ritual be started on that day. In the conversation, Karna refers to the lunar eclipse that had already taken place and to an impending solar eclipse but there is no reference to the number of days between the two eclipses. This reference gives us an idea about the close dates to Mahabharata war but not the exact date as this refers to the beginning of the war ritual and not the war itself.

ASTRONOMICAL REFERENCES OF BHISMA PARVA

On the eve of the war, Vyasa meets Dhrtarashtra and describes a whole set of ill omens he has seen. All these omens are described in two chapters as four different sections which may be because they all took place at different time. In Slokas 20-23 of chapter 2, Vyasa describes the omen foretelling the imminent war. Most of the references here are linked with the observation of the sun and moon. Vyasa observes that during sunrise and sunset there had been appearance of halos and some comets which seemed to enclose the Sun and the Moon being lusterless on the lunar eclipse day of karttika purnima. These omens are indications to a great war according to Atharvaveda Parisista. In Atharvaveda, one is asked to observe the line of clouds and halos around the Sun and the Moon and to check whether the colour is red or not. It is considered as an omen if it is blue and red near the edges and dark in the middle, accompanied by lightning. Whenever the sun is surrounded by Balahaka clouds during sunrise and sunset; it indicates that a disaster is going to fall upon the royal families. No planetary references are used in this segment. In the next segment, Vyasa explains about the omens that foretell the great downfall of the Kuru dynasty and refers to the lunar eclipse, which occurred on the full moon day at karttika, followed by a solar eclipse. He also refers to Saturn afflicting Rohini and Svetagraha transgressing Citra, which indicates the selective destruction of the Kuru clan.

These are the same events that are described by Karna in the conversation with Krishna (Udyoga Parva). The third segment deals with the omens that indicate a calamity to the entire army. But the description of the planet being at different places at the same time confuses the scholars. Some scholars believe that the use of the word graha not only means planets but also comets. In the final segment, Vyasa describes the omens which indicate destruction of the entire population; these include a pair of eclipses, a lunar and a solar eclipse occurring in the same month and within an interval of thirteen days, and at an aparvani moment (i.e. not at the moment of exact conjunction or opposition of the sun and the moon).

METHODOLGY AND SIMULATION

Since there is clear evidence of the planetary position from both Udyoga Parva and Bhishma Parva it is just a matter of creating the same arrangement and finding the time when this happened. The positions of the comets are not found reliable. The important references to planets consist of those that are common to both Udyoga and Bhishma Parvas and include the following:

- (i) Conjunction of Sani(Saturn) with Rohini(Aldebaran).
- (ii) Retrograde motion of Angaraka (Mars) just before reaching Jyestha (Antares).
- (iii) A lunar eclipse on the Karttika Purnima; followed by
- (iv) A solar eclipse at Jyestha.

All the planetary positions mentioned above are periodical which would leave a large number of possibilities for the occurrence of an event. But the possibilities are cut short when all the planetary events are taken together. Between the period of 3500 B.C.E and 500, C.E conjugation of Saturn with Aldebaran occurs 137 times and this number is reduced to 17 while considering the retrograded motion of Mars before reaching Antares. Now the possibilities of eclipses are taken into consideration and only two years, 3067 B.C.E and 2183 B.C.E are left out. Bhishma passed away on the Magha Sukla Astami after the occurrence of winter solstice. Considering this a unique date is obtained – 13 January 3066-B.C.E. From all this, 3067 B.C.E

is considered to be the year of the Mahabharata war. There are several other astronomical references in the Mahabharata that serve as evidences for the accuracy of the determined year.

INTERNAL CONSISTENCY IN THE EPIC OF THE DATE 3067 B.C.E

- The Adhimasa for 3067 B.C.E can be found by using methods based on Vedanga Jyothisa.
- The date shows that there are only 48 days after Bhima's fall in the battlefield. However the number of sleepless nights spent are 58. This is due to the 10 days of war that he fought and he lacked sleep due the various stresses involved.
- The war did not start on an Amavasya. This is the interpretation that scholars have made because of a letter sent to Bhishma and Drona by Krishna. However only Yudhisthira and Duryodhana were allowed to declare the war. This makes the claim false.
- An important astronomical data that is used by historians actually refers to comets and not a planetary configuration. Therefore using this data is consistent with astronomical references in the epic.
- The date of departure of Krishna is in accordance with the observations of planetary simulation Since the date of departure is 3031 B.C.E. He passed away 36 years after the end of the war. The date of Mahabharata is consistent with this observation.
- The famous reference of 2 eclipses falling within a period of 13 days is constant with the predicted period.
- The conjunction of Sani with Rohini, forms a major planetary configuration in deducing the date of the war. This is the indicator for disaster and end of the world and may have some astrological significance at the time of Mahabharata.

Therefore it can be concluded that the great Mahabharata war had happened in 3067 B.C.E.