

Samvit



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Knowledge beyond time

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Editorial

As Indians, many of us are aware of our country's cultural heritage, but very few of us give it its due importance. We know of the great Indus Valley civilisation, the mighty Ganga, the glorious sanskrit language and its literature, the Vedas, the Upanishads, the numerous art forms, and the thousands of temples and monuments that have become a part of the Indian life. But, while most of us know that Nalanda was one of the world's earliest universities, perhaps only a few know that the university had more than 8,000 students from all over the world, and even entrance examinations as part of the admission process! Most of us have read about Acharya Sushruta and his contributions to the field of medicine, but did you know that plastic surgery was practised in India as early as the 6th century B.C.E.? India also has to her credit some of the earliest advances in the fields of astronomy, mathematics and economics.

In this issue of Samvit, we bring to you an interesting account of how the famous mathematical treatise, 'Leelavati' was conceived, how ancient Indian mathematicians had accurately predicted the value of pi and even expressed this fact in the form of a sloka, and how Sushruta had pioneered the science of plastic surgery. One of the highlights of this issue is an article by renowned historian Michel Danino, on the fallacies in the Aryan invasion theory. Finally, we hope you enjoy reading this edition as much as we enjoyed producing it for you.

Children, in the olden days people had the same needs as today. They wanted food, clothing and shelter. They also had their education. They had games, arts and sports. They had civilization. They too led a married life and had children. The difference is that their way of life was not only concentrated on the world outside but on the world inside as well. They did not live only to acquire and possess wealth but also to know God. They had self-control and inner discipline. They always tried to develop good qualities like truth, compassion, love, renunciation, and patience. They were concerned not only about their own family but also about society. Each person truly felt that he or she had a duty towards society and discharged it sincerely and whole-heartedly. But today's world is just the opposite of this. People, due to their selfishness and ego-centered nature, have turned the world into a hell. Previously, the world was like heaven. We now point our fingers at each other. We criticize and question the other's arrogance or ego-centeredness. We cannot bear the other person's ego. Children, what about our own? We never think about that. We think that our ego is not a problem but that it is the other person's ego which creates problems. What a strange attitude this is. In reality, it is our own ego which creates the problems in our own life, not the other person's. Our ego should become a burden for us; only then will we try to get rid of it. At present we think that our ego is an adornment for us. This feeling inspires us to keep it as something precious. Just as you feel that the other person's ego is unbearable to you, your ego is just as unbearable to someone else. Therefore, try to eliminate it.



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LEELAVATI

One of the greatest works of Bhaskaracharya, the greatest mathematician of medieval India, is Siddhanta Shiromani of which Leelavati is a part. Leelavati is a comprehensive exposition of arithmetic, geometry, algebra, mensuration and number theory. It was written in the Twelfth century and was used in India as a textbook for many centuries.

Myth behind LEELAVATI

Leelavati was the name of Bhaskaracharya's daughter. From her horoscope, he discovered that the auspicious time for her wedding would be a particular hour on a certain day. He placed a cup with a small hole at the bottom of the vessel filled with water, arranged so that the cup would sink at the beginning of the propitious hour. When everything was ready and the cup was placed in the vessel, Leelavati out of curiosity, bent over the vessel and a pearl from her dress fell into the cup and blocked the hole in it. The lucky hour passed without the cup sinking. Bhaskaracharya believed that the way to console his dejected daughter, who now would never get married, was to write her a manual of mathematics! This is the origin of LEELAVATI.

Leelavati is a monumental work. To explain a topic like Mathematics in verse form is indeed a difficult task, but it is still more difficult to infuse poetic qualities. Bhaskaracharya, however, overcame all these hurdles and wrote this magnificent work.

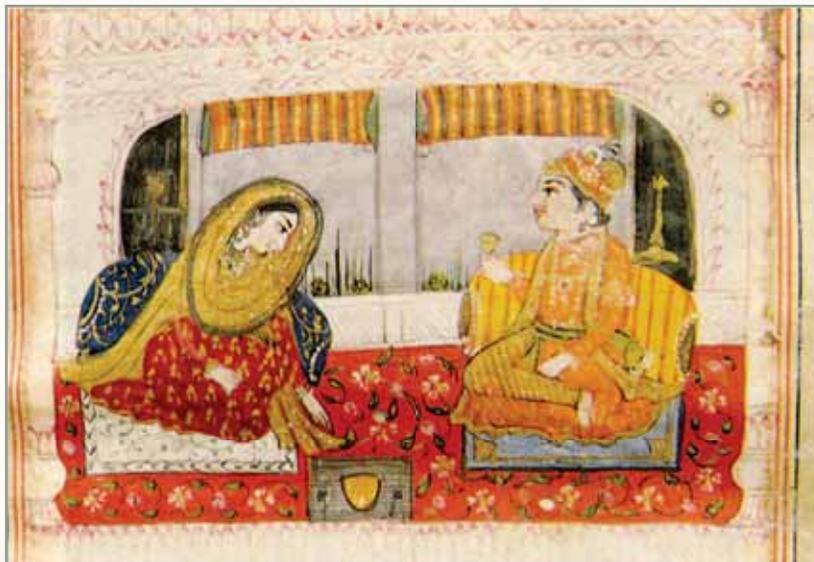
The reader's attention is specially drawn to various forms of expressions used to address the student in different stanzas. Thus we find: "O, you intelligent girl Leelavati", "friend", "My beloved", "Deer eyed", "Fickle-eyed" etc. Scholars may draw varying conclusions from these

regarding the types of students studying in the classes of Bhaskaracharya. Yet, one thing is clear to the readers that learning begins with fun and flourishes in wonder.

Bhaskaracharya himself never gave any derivations of his formulae. Mathematicians of later periods worked hard to construct proofs for several mathematical methods and formulae given in the original.

Samples:

1. Arjuna became furious in the war and, in order to kill Karna, picked up some



arrows (say X^2). With half of the arrows ($1/2 X^2$) he destroyed all of Karna's arrows. He killed all of Karna's horses with four times the square root of the arrows ($4X$). He destroyed the spear with 6 arrows. He used one arrow each to destroy the top of the chariot, the flag, and Karna's bow. Finally he cut off Karna's head with another arrow. How many arrows did Arjuna discharge?

2. In a market, 300 mangoes can be purchased for 1 dramma = 16 paise. However, 30 pomegranates of good quality are available for 1 paisa. Find out quickly how many Pomegranates can be exchanged for 10 mangoes.

MANIA long before Ramanujan

Long before Ramanujan, Indian savants showed a 'mania' for large numbers; the Rig Veda makes frequent mention of 100,000 (foes, gifts, cattle heads...). [5] while the Yajur Veda goes up to a million million

(10^{12}), a number it calls Parardha.

While reaching out to the infinite, some of India's common symbols of infinity were put to good use: numbers such as (109, 1027, 10105, 10112, 10119) were named after the lotus, others after the ocean, the earth and of course ananta, the infinite itself.[2]

The term Khachheda was introduced by the great mathematician Brahmagupta in his Brahmasphuta Siddhanta (628 CE), 'Khachheda means divided by 'kha', kha being 'space' or 'void', one of the names for 'Zero'. Khahara, with a similar meaning, was used later by another celebrated scientist, Bhaskara II or Bhaskaracharya (12th century)

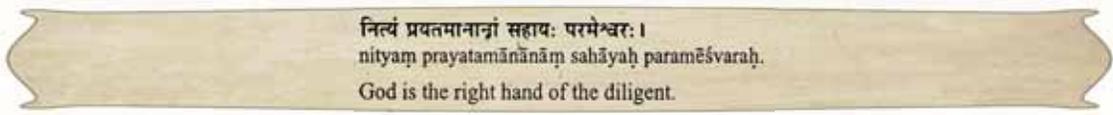
The overall assessment of Mathematics and astronomical advances remains highly flattering and Indian savants were much ahead of their Western

Counterparts.

by Ravichandra, S5 EEE

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2. Michel Danino, *Indian Culture and India's Future*, 2011.
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Mind Boggling: Plastic Surgery in Ancient India

Dr. Sreevidhya, MD, Dept of Salakya Tantra(Eye and ENT), Amrita School of Ayurveda

Plastic surgery is a specialized branch of surgery devoted to the treatment of deformities of the face and other parts of the body. The purpose of plastic surgery is to restore the appearance and functions of the parts of the body which are destroyed or damaged due to disease or injury. Contrary to popular belief, plastic surgery (reconstructive surgery) is not merely cosmetic surgery but an important discipline that aims at correcting all sorts of physical deformities.



The Sushruta Samhita, the oldest known treatise on Ayurveda mainly deals with surgical knowledge. In northern India, during the 6th century BC, Acharya Sushruta focused on soft-tissue augmentation for amputation injuries, and nasal, aural and labial reconstructions.

The plastic surgery of the ear (Otoplasty-Karna Sandhana), nose (Rhinoplasty-Nasa Sandhana), and lip (labioplasty- Oshta Sandhana) are described in the 16th Chapter of Sushruta Samhita Sutrastana. Sandhana means 'to mould' or 'to shape'. The method for piercing the earlobes of an infant is mentioned. This is still practiced in India as Samskara (Karna Vyadhana Samskara – performed during the 9th month of a child). Often the pierced earlobe, due to the use of heavy ornaments or due to some injury gets considerably expanded and ultimately sunders. So, different methods of Sandhana



are mentioned to join ear lobes. For such operations, a piece of skin is taken from the cheek, turned back, and the lobules are suitably stitched. The guidelines for procedures to be

adopted during the post-operative period of surgery including the dressing of the wound, use of various herbal medicines for healing the wound etc are mentioned with minute details in the Sushruta Samhita.

In Rhinoplasty and Otoplasty, Acharya used the method of skin grafting. Here, the portion of the nose to be corrected was measured with a leaf. Then a piece of skin of the required size would be dissected from the living skin of the cheek and turned back to cover the nose, keeping a small pedicle attached to the cheek. The part of nose to which the skin is to be attached was made raw by cutting the nasal stump with a knife. The physician would then place the skin on the nose and stitch the two parts swiftly, keeping the skin properly elevated by inserting two tubes of Eranda (Castor oil plant) in each nostril so that the nose gets proper shape and the patient could breathe easily. The skin is thus adjusted as required. This was bandaged properly by following wound healing measures. Reconstruction of the broken lip and hare lip (Oshta Sandhana-labioplasty) are also mentioned by Acharya Sushruta

In those days, the punishment for criminals and unfaithful wives was amputation of the nose of the offenders. Thus there was a lot of scope for the practitioners of plastic surgeries.

From 1769 CE to 1799 CE, four Mysore Wars were fought by Hyder Ali and his son Tipu Sultan against the British Army. As a result of the above wars the British learnt two very important Indian techniques- Rocketry and Plastic surgery. Both these Indian techniques were further improved first in England and then in other European countries. How the British learnt the art of Indian Plastic surgery is a fascinating story.

A Maratha bullock-driver, Kawasajee, who had served the British and four tilanges (Indian soldiers of British army) had fallen into the hand of the Sultan of Srirangapattanam. His nose and right arm were cut off as punishment for serving the enemy. Then he was sent back to the English command. After some days, when dealing with an Indian merchant, the English commanding officer noticed that he had a

peculiar nose and scar on his forehead. On enquiry, he came to know that the merchant's nose had been cut off as a punishment for adultery and that he had the substitute nose made by a Maratha Vaidya. The commanding officer asked the Vaidya to reconstruct the nose of Kawasajee and the others.

These operations were performed near Pune in the presence of two English doctors, Thomas Cruso and James Findlay. An illustrated account of this operation carried out by an unnamed Vaidya, appeared in the Madras Gazette. Subsequently the article was reproduced in the Gentlemen's Magazine of London in October 1794. The description in the magazine fired the imagination of the young English surgeon J.C. Carpuie, who after gathering more information on the 'Indian Nose' performed two similar operations in 1814 with successful results. After this, plastic surgery became popular throughout Europe. All replacement operations which use a flap



of skin in the immediate vicinity of the nose are known as Indian Plastic Surgery. Though a very old technique, plastic surgery has made great strides only after the First World War. The above article has been reprinted in "Classics of Medicine Library", Bethesda 1981.

After getting fresh impetus from India, Plastic Surgery has made great progress in the past 200 years. In 1993 the 1st International Congress of Plastic Surgery was held in Paris. As an Indian, one should remember that the source of Plastic Surgery is the Sushruta Samhita and that, it was from Indians, that the Europeans learnt the time immemorial technique of Otoplasty & Rhinoplasty.

Ref:-

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- 2.Employment new weekly of 19-25 Feb.2000. Vol.24 No.47 under the title Plastic surgery in ancient India.
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न कश्चिन्नपराध्यति ।
na kascinnāparādhyati. VR
No one is ever infallible.

Book review: Wanderings in the Himalayas

by Atish K
Biotechnology

'Wanderings in the Himalayas' by H.H. Swami Tapovanji Maharaj, is one of the finest spiritual books that I have read. The book is a travelogue on the Himalayas. It is full of poetic descriptions of places in the Himalayas, sacred to millions of people in the country.

The very purpose of life is to discover the ultimate truth; the mighty Himalayas have always held an attraction for the true seeker. In this book, one can read how a man of divine vision beholds truth everywhere, be it in the beautiful trees or among singing birds, in the roar of animals, in the bright expanse of summer sky, in the rising sun or in the crescent moon, in the darkness of the night, in dancing peacocks, jumping monkeys, or at the sight of the innocent villagers of the Himalayan hamlets sitting and smoking their native pipes.

The book also speaks volumes of the eternal principles of Sanatana Dharma. These principles have stood the test of time, and remain unchanged. The author describes the grand and peaceful Himalayas which remain motionless, as if in deep meditation and says that the high topographical location of the Himalayas resembles the elevated and enlightened spiritual state. The places described in the book include Hrishikesh, Kedarnath, Badrinath, Anantanaag, Sarada and Gangotri.

The book has great relevance in today's world, because the need of the hour is not superficial development but true spiritual awakening. The sincerity of the writer lends a secret charm to the book and leaves the reader spellbound.

I am using a story to tell you how I feel when I am near AMMA

How do I feel when I am near AMMA? When a small child is left in a crowded place, his eyes will search for a familiar face and what would be his reaction when he suddenly sees his mother in that crowd? He would run to embrace her and would find himself without words to describe how worried and scared he was. I am like that child in his mother's embrace. I have not told Amma about my pain and worries, or about unfortunate experiences that bring tears to my eyes every night. In fact I do not think about them when I am near Her. My mind urges me to be happy as I experience the most precious moments of my life Each night is beautiful when spent in yearning to be in that gale of happiness again.

Anand MG
S7 ECE B

Mathematicz in Sanzkrit

Sanskrit is generally considered as the language used in the works of Indian spirituality, religion and philosophy. Not many people know of the vast amount of literature available in Sanskrit on grammar, mathematics, astronomy, chemistry, architecture, polity and warfare. In this article, we take a look at some interesting slokas in Sanskrit on mathematics and astronomy. These slokas also showcase the fact that these mathematical theorems were known to Indian mathematicians much before their Western counterparts discovered them.

To begin with, consider the famous Pythagoras Theorem:

The square of the hypotenuse of a right angled triangle is equal to the sum of the squares of the other two sides. It was Baudhayana who discovered this theorem around 600 B.C.E. Here is the sloka written by Baudhayana himself:

दीर्घचतुस्त्रस्यक्षणा रज्जुः पार्श्वमानी तिर्यञ्चानी च
यत्पथम्भूते कुरुतस्तदुभयं करोति ॥

"The diagonal of a rectangle produces by itself both (the areas) produced separately by its two sides". Another instance of a mathematical discovery by Baudhayana is the calculation of the approximate value of the square root of 2. He says:

कर्णी तृतीयेन वर्धयेत्तच्च
स्वचतुर्थेनात्मचतुस्त्रिंशोनेन सविशेष इति विशेषः ॥

"Increase the measure by its third and this third by its own fourth less by the thirty-fourth part of that fourth. The name of this increased measure is savisesa".

If we take unity as the base measure and write Baudhayana's sloka in an algebraic language:

$$\text{Square root of } 2 = 1 + (1/3) + (1/(3 \times 4)) - (1/(3 \times 4 \times 34)) = 1.4142156$$

This is an very close approximation of the square root of two, if we consider the fact that this sloka was written around 600 B.C.E !

Aryabhata, in the following sloka, gives the value of pi, correct to four decimal places:

चतुरधिकं शतमष्टगुणं द्वाषष्टिस्तथा सहस्राणाम् ।
अयुतद्वयविष्कम्भस्यासन्नो वृत्तपरिणाहः ॥

"100 plus 4, multiplied by 8, and added to 62,000: this is the approximate measure of the circumference of a circle whose diameter is 20,000."

This gives $\pi = \text{circumference}/\text{diameter} = 62832/20000 = 3.1416$. Aryabhata had written this sloka around the first century B.C.E, but surprisingly, he calls this value an approximation.

Aryabhata also gave, for the sidereal period of Earth's rotation about its axis, a value that is astonishingly close to the modern one. This is obtained from the number of eastward rotations of the Earth in a Yuga, as stated in part of a sloka.

युग . . . डिशिवुण्लृष्व् प्राक् ।

"In a yuga, the eastward rotations of the Earth are 1582237500. Siderial period of Earth's rotation is equal to 1,57,79,17,500/1,58,22,37,500 days = 23 hours, 56 minutes, 4.1 seconds".

The corresponding modern value is 23 hours, 56 minutes, 4.091 seconds. The numerical value borne by the letter chronograms of the preceding verse have been deciphered using Aryabhata's first rule on the alphabetical system of expressing numbers:

वर्गाक्षराणि वर्गेऽवर्गेऽवर्गेऽवर्गाक्षराणि कात् इमौ यः ।
खद्विनके स्वरा नव वर्गेऽवर्गे नवान्यवर्गे वा॥

Compiled by Meera Viswanath, S7 ECE

Reference: 'The Wonder that is Sanskrit'- Sampad & Vijay, Sri Aurobindo Society, Pondicherry.

सर्वमुत्पादि भङ्गुरम् ।
sarvamutpādi bhāṅguram.
Everything born is transient.

THE INVASION THAT NEVER WAS

by Michel Danino

This article examines the Aryan invasion theory in the light of modern evidence.

Accounts of India's early history usually begin thus: Some 1,500 years before the Christian era, hordes of semi-barbarian, Sanskrit-speaking nomads called 'Aryans' poured from Central Asia or thereabouts into Northwest India. There, they came upon the flourishing Indus Valley or Harappan civilization, whose inhabitants were 'Dravidians.' The invading Aryans destroyed this civilization and drove the Dravidians southward, then over a few centuries composed the Vedas, got Sanskrit to spread all over India, and built the mighty Ganges civilization. That, in a nutshell, is what most 'educated' Indians know of their distant past, and is still today presented as solid knowledge.

Yet, the 'Aryan Invasion theory' does not rest on a single solid piece of evidence. In fact, it has by now been convincingly disproved by all the evidence brought to light by archaeology,



genetics, astronomy, ancient geography and mathematics. Nevertheless, those in India, who today argue against it, are still eyed with considerable suspicion, as if they have committed some awful crime, and we can expect this venerated, if crumbling pillar of ancient history to be around for some more time.

The Birth of a Myth

How did this theory come to be so widely accepted if it is wholly groundless? To begin with, it was propounded in the nineteenth century by European scholars who could not help finding striking similarities between Sanskrit and Greek or Latin, pointing to an ancient link between those languages. But since the British Empire was then at the height of its glory and Europe as a whole was basking

in her new-found Enlightenment, those proud scholars could hardly accept that they owed their languages and civilization to a benighted India—it had to be the other way round. At the same time, the Indian mind had become largely subservient to the West (is it much better today?), and would rather listen to these worthy scholars led by the prestigious Max Müller than to India's own savants and seers.

Swami Dayananda Saraswati was perhaps the first to reject the Aryan invasion theory, emphasizing that the word *arya* referred in the Veda to a moral or inner quality, not to any race or people. Swami Vivekananda followed suit with characteristic vigour. In a lecture he remarked: "And what your European Pandits say about the Aryans swooping down from some foreign land snatching away the land of aborigines and settling in India by exterminating them is all nonsense, foolish talk. Strange that our Indian scholars too say amen to them.... As for the truth of these theories, there is not one word in our scriptures, not one, to prove that the Aryan ever came from anywhere outside India...."

Then Sri Aurobindo, taking a straight look at the Veda, observed: "The Vedic indications of a racial division between Aryans and Dasyus and the identification of the latter with the indigenous Indians [are] of a far flimsier character than I had supposed." This division, he found, is "a conjecture supported only by other conjectures ... a myth of the philologists." Sri Aurobindo forcefully refuted "the artificial and inimical distinction of Aryan and Dravidian which an erroneous philology has driven like a wedge into the homogeneous Indo-Afghan race."

But none listened—we Indians have long had the inexplicable habit of accepting change only if it comes to us from the West. Yet in recent years, some voices have begun to be heard, both in the West and in India, asserting that the time has come to chuck out this worm-eaten theory once and for all.

Indian Tradition

What strikes us at first sight is that the Aryan invasion theory and its resulting contrived reconstruction of India's ancient history is in



head-on contradiction with Indian tradition. To begin with, no Sanskrit (excuse me, 'Aryan') scripture makes any reference to an original homeland outside India; quite the contrary, the Rig-Veda clearly knows no geography outside North India. It is hard to imagine that the Vedic people, who had such a strong bond with the land, its mountains and forests and rivers, would not have carried into their culture the least memory of their supposed ancestral steppes in Central Asia.

Moreover, we are asked to believe that in just a few centuries, five at the most, the semiprimitive, cattle-rearing Aryans not only conquered North India, but established there a great civilization and created all over the subcontinent a unique philosophy and culture founded on Sanskrit and the Veda—quite a stunning development. Civilizations and cultures took millennia, not a few centuries, to evolve, mature and spread, and the refinement and richness we find in the earliest Indian thought and the Sanskrit language are incompatible with the supposed primitiveness of the recent Aryan settlers.

Archaeology

Let us now see what archaeology has to say in the matter. Its first observation, a negative one on which all archaeologists agree, is that no findings have been made east of the Indus which could be associated with a group of Aryans coming into India; surprisingly the 'invaders,' who are said to have swamped a large part of India, have left no physical trace whatsoever of their arrival—no new type of pottery, no figurine, no tool or other artefact, and above all no man-made destruction of Harappan cities indicate the discontinuity their supposed arrival should

मानो हि महतां धनम् ।

mānō hi mahatāṃ dhanam. CN.6.16

Dignity itself is the wealth of the great.

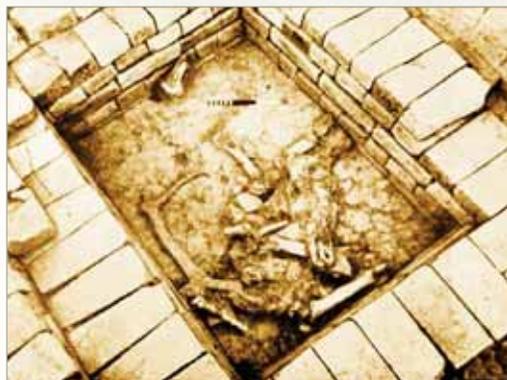
have left. U.S. archaeologists such as G. F. Dales, Jim Shaffer, J. M. Kenoyer, French archaeologist Jean-François Jarrige and many others have



all rejected the Aryan invasion theory as being without evidence and contradictory to the long continuity of Indian civilization as shown in the archaeological record.

Then, in early 1921 we have the discoveries of the Indus Valley

civilization. It extended over an area twice the size of Egypt and Mesopotamia together, and had an advanced urban development, an extensive internal and external trade, a remarkably efficient administration, and a still mysterious script. Its antecedents go back to at least 5000 BC, and the dates of its "mature phase" (2600-1900 BC) forced most scholars to conclude that it was 'Pre-Aryan' and Pre-Vedic. Yet seals depicting deities seated in yogic postures, figurines in various yoga asanas, fire and sacrificial altars, figures of the so-called Pasupati and the Bull, worship of a Mother goddess, the swastika and other Vedic symbols—all these are strongly suggestive of Vedic culture, as well-known Indian archaeologists such as B. B. Lal or S. R. Rao have pointed out. Moreover, another archaeologist, R. S. Bisht, has recently shown that Harappan town-planning is fairly well described in the Rig-Veda. Finally,



were the Harappan civilization indeed pre-Aryan, we would have the strange paradox, cogently pointed out by David Frawley, of the Indus Valley inhabitants leaving behind no literature, though they were literate, but

a huge physical presence now brought to light by archaeology, while the Aryans, who gave us an enormous literature, left no physical trace of any sort! All this has made an increasing number of scholars veer to the view that the Harappan civilization had a Vedic or even post-Vedic culture. As Colin Renfrew, an eminent British archaeologist, put it, "It is difficult to see what is particularly non-Aryan about the Indus Valley civilization."

The Sarasvati

That is not all. The Veda, as we know, lavishes praise on the long-lost Sarasvati. The great river has been found again—rather its dried-up bed, traced over decades by geologists and archaeologists and confirmed by satellite photography. It flowed down from the Himalayas reaching the plains near Ambala in Punjab, then through Rajasthan and Pakistan's Cholistan desert in a course south of and roughly parallel to the Indus, and finally into the Rann of Kutch and the Arabian sea. It was indeed a mighty river, six to eight kilometres in width, with the Sutlej and Yamuna being its tributaries. Detailed studies have shown that it changed course several times before drying up completely around 1900 BC. As it happens, its location, its physical characteristics, even the stages of its drying, are described in the Rig-Veda, the Mahabharata and several Puranas—scriptures which the invasion theory forcibly dates several centuries after the Sarasvati went dry! Moreover, hundreds of Harappan sites have been found along its course (many more than along the Indus); this concentration, according to archaeologist Dilip Chakrabarti

"is a definite indication that this civilization was speaking an early form of Sanskrit." Indeed, some scholars are now suggesting that the Indus Valley or Harappan civilization would be better named the 'Indus-Sarasvati civilization.' The great river is the best confirmation of the Harappan-Vedic connection.

Is further proof needed? Well, there is plenty of it from anthropology and genetics, as they establish a biological continuity in India's North-west

populations around the time of the supposed invasion, from astronomy, since the Vedic symbolism refers to celestial events such as solstices and equinoxes which can be dated to



between 4000 and 6000 BC, from mathematics, metallurgy...

A New Picture

The new picture that emerges of India's ancient past is one of continuity through the ages: the Vedic Age preceding or coinciding with the Indus-Sarasvati civilization and followed by the Ganges civilization. No doubt, much has to be integrated into the new perspective, and much more remains to be discovered, but we can now breathe a little more freely.

This picture is not wishful thinking: it is supported both by tradition and modern research. True, archaeology is far from confirming the traditional dates of Indian chronology, but nothing in our knowledge of those remote times warrants the fallacy of a sharp demarcation between Aryan and Dravidian races, languages, cultures, even deities (Shiva is Dravidian, Vishnu is Aryan!). Whatever twists and turns the Indian civilization may have followed, whatever migrations may have taken place to and from India, a rigid break between Pre- and Post-Aryan India finds justification neither in the Scriptures nor in archaeology. It is safe to predict that future archaeological findings will further confirm the essential continuity of Indian civilization.

Why, one may ask in the end, should we worry so much over debunking a theory about our remote past? Precisely because it denies that remote past, because it turns the Veda into a largely meaningless hodgepodge of superstition cobbled together by primitive barbarians, because it makes nonsense of what has been for millennia, the source of India's spiritual life and strength. And because the past is never past, never dead, and often holds the key to the future.

[French-born Michel Danino has been living in India for 35 years. He has authored several books on Indian culture and ancient history, namely *The Lost River: On the Trail of the Sarasvati* (Penguin Books, 2010) and *Indian Culture and India's Future* (DK Printworld, 2011).]

न कोऽपि कर्तुं शक्नोति भजनं भोजनं विना ।
na kō'pi kartuṃ śaknōti bhajanam bhōjanam vinā. KR.p173
None can worship the Lord on an empty stomach.

NALANDA : Education globalised in fifth century India

These days, we frequently come across educational institutions that call themselves 'global'. 'Global' in the sense that their student communities span several nations. But India had her first global university in Nalanda hundreds of years ago, way back in the 5th century CE. And, if that is not remarkable enough, this University had nearly 8,500 students, buildings that were four storeyed high, and even entrance examinations for admissions to it. The Nalanda Mahavihara was the most well known University in India at that period and the most sought-after by scholars not only in India but all over Asia.



Nalanda was the name of an ancient village (modern day Baragaon) in Bihar. Nalanda Vihara, initially established as a monastery, grew into one of the greatest centers of learning, especially in Mahayana Buddhism. Today, we know about Nalanda from the records of foreign scholars who had visited it. The description of the Nalanda Mahavihara by Chinese scholars Yuan Chwang and I-tsing tell us that it was a huge establishment. Archaeological excavations at Nalanda have also shown that its establishment covered an area at least one mile long and half a mile broad. The excavations have unearthed more than 11 large monastery sites and several temple sites, besides numerous antiquities belonging to the Gupta and post-Gupta period up to the 11th century C.E. Yuan Chwang, in his biography, gives a very interesting account of the architectural magnificence of the University. He says- "...the richly adorned towers and the fairy-like turrets are congregated together. The observatories seem to be lost in the vapors (of the morning) and the upper rooms tower above the clouds...". Most of the collegiate buildings as well as the residential buildings were four-storeyed with beautifully sculpted pillars and exuberant rows of balusters and parapets.

Nalanda was a centre for higher learning, and was noted for its specialisations in the last stages of University education, for aiding in the clearance of doubts and training in the art of public speaking. Scholars from China, Tibet, Mongolia and even Korea came to Nalanda. In fact, a fellowship of Nalanda was considered as the highest academic degree or distinction of those times. Hence, the University had the system of entrance examinations, and qualifying for admission was not an easy task. That the entrance examinations were tough is evident from the fact that only about twenty percentage of the total number of students who appeared for the test finally succeeded. Many a time students who wished to enter the schools of discussion were beaten by the difficulties of the problems and withdrew, only those who were deeply versed in old and modern learning were admitted. According to Hwui-Li, the biographer of Yuan Chwang, a total of 10,000 monks resided in this religious-cum-educational institution, of which as many as 1,500 were teachers. The

courses of study offered by the Nalanda Mahavihara were drawn from several different fields-Brahmanical and Buddhist, sacred and secular, philosophical and practical, sciences and arts, and in all its branches of studies, Nalanda was considered as the highest seat of learning. So much so that scholars like Hiuen Tsang, who were already masters in their field, considered it profitable to stay at Nalanda for further intellectual progress. As many as hundred different lectures were delivered daily and the students attended these discourses without fail. And though the University belonged to Mahayana Buddhism, the works of the Hinayana school were also taught, indicating the comprehensive nature of the curriculum. The University provided for all its students food, clothing, bedding and medicine. The academic life at Nalanda was strict, and the residents had to observe several rules and regulations. The university had a rich library also. Information about the library is given in Tibetan accounts, which mention that the library comprised three huge buildings, called Ratnasagara, Ratnodadhi and Ratnaranjaka, of which Ratnasagara, which was a nine-storeyed building, specialized in the collection of rare sacred works.

A remarkable feature of Nalanda was that though it had initially been a monastery, it later emerged as a corporate centre for higher learning, where education was imparted not only to monks and nuns but to the general public also. The Nalanda Mahavihara was open to all systems and schools of thought and belief. Many a time it became an arena where scholars would fight out their supremacy in debates and discussions, and it was believed that a doctrine approved and recognized here would be universally accepted. At the time of Yuan Chwang's visit, the average scholarship of the University was also very high. The scholars at Nalanda were some of the most well-known of their times. Amongst them were Dharmapala, Chandrapala, Gunamati, Sthiramati, Jinamitra, Jnanamitra and Silabhadra. Out of its 10,000 monks, there were a thousand who could explain thirty collections of Sutras, and almost ten who could explain fifty.

The affairs of the University, from the annual assignment of rooms to the trial and punishment of offences were jointly managed by an assembly of priests and the entire body of students. This was indeed a very bold principle, that discipline among students is best promoted by leaving it in their hands. The establishment was thus based on both autocratic and democratic principles, the former applying to areas of intellectual and moral training. The harmony among the teachers and students of Nalanda is attributed to this democratic management, and Hiuen Tsang observes in his records that "in the last seven centuries there has not been even a single instance of this harmony being marred by a guilty rebellion".

Nalanda retained her glory and prestige as the highest centre of learning for several centuries, until in 1197 when Mohammad ibn Bakhtiyar Khalji and his army of Turks attacked Bihar. Monks were mercilessly killed and their books burnt. Many of the monks fled to Tibet and Nepal. It is indeed sad and unfortunate that an institution as great as Nalanda should have fallen into the hands of a few plunderers. Needless to say, the decline of Nalanda was not just the decline of an institution, but of an entire system of education. That such a University had existed hundreds of years ago and was so advanced – that is something every Indian can definitely be proud of.

By Lekshmi Ramesh(S7 ECE)

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By S R Goyal

मिष्टान्नभुक्तिः कटुका च वाणी विस्मर्यते नैव कदापि कैश्चित् ।
miṣṭānnabhuktih kaṭukā ca vāṇī viśmaryate naina kadāpi kaiścit.
KR.p182

Two things are unforgettable: a hearty meal and a vitriolic words.

THEYYAM-Art deified in Malabar

A recent visit to Cannanore made me realize the authentic glory of Malabar, the ancient Kolathunadu. Even to this day, fort silently speak of the royal reign of Kolathiri. It struck me that numerous traditional homes over there have hundreds of stories to narrate. Theyyam, the ritualistic temple art form of Kerala, has a lot to speak about Malabar. Every folk tale related to theyyam actually speaks about the lifestyle, customs and beliefs of the Malabaries.



Wynattu Kulavan

Let me start by narrating the story of the brave Devakanyavu. Born in the prosperous Rayaramangalam mana, she was well known for her extraordinary brilliance and profound knowledge of the Vedas and Vedic texts. Being a student of Perinchelur gurukula, she was the enemy of all male dwellers there. Not even the Guru could digest the dominance of Devakanyavu in vedic knowledge. She became their prey. They were waiting for an opportunity to lay their trap and reap vengeance.

After a few days, Devakanyavu's marriage was fixed with her uncle's son. Two days before her marriage, Natturaja Pachanambi came to meet her. With a lot of concern, he presented the matter before her- the Udayamangalam discourse on Vedic texts was in need of a person from his province. He knew the right person was Devakanyavu, but it was unimaginable that a girl, whose marriage was fixed, participating in a discourse was out of question and moreover it could get extended to many days. Devakanyavu boldly dismissed all these issues and once more dove into the deep corners of Vedas for the final preparation.

The discourse was about to start and the Perinchelur pundits were ready with their questions to attack Devakanyavu. Humility reigning on her face, she offered humble pranams to the pundits assembled and to her teachers. The discourse started and Devakanyavu gave keen and terse answers with the speed of an arrow depleting the strength of the opponents. But, on the third day of discourse the pundits laid a trap. Like an arrogant lion the senior person asked her the first question, "which pain is the most beautiful and painful?" Her answer came like an impulse; "the pain of a mother while delivering her child." A wave of shock traversed through the audience. The second question was asked immediately, "Which is the most beautiful feeling?" The reply created a tremor among the crowd, "Lust", she said.

This was more than enough. How could an unmarried girl give answers like these? What did a virgin maiden know about lust? The judgment was pronounced – she had gone against the rules of her caste. She had to be exiled. Devakanyavu was immediately taken to the borders and sent out of the province. She, being alone and one who had flaunted the rules reached the temple of Payannur Perumal. Suddenly a divine voice was heard. It claimed that Devakanyavu was a divine maiden and a curse had turned her into a human being. The voice advised her to sacrifice herself in a fire. She followed the advice and entered into the sacrificial fire. A man belonging to the Vaniyan caste came along that way and Seeing Kanyavu in flames he was stunned. She requested him to pour the oil he carried into the fire. Without hesitation he did so and Kanyavu blessed him for helping her in such a grave situation. He witnessed Kanyavu becoming a handful of ashes. With the blessings of Lord Shiva she became Sakthi and advised Muchilakodan Vaniyan to construct a temple for her. Thus, she became the Muchilottu Bhagavathi and became the Goddess of Vaniyan samudayam. The Theyyam of Muchilottu Bhagavathi is very famous in North Malabar. The devotees make a list of vows to get blessed with health and wealth.

The social relevance of Theyyam is really amazing. It distributes itself to many sectors of society. Even today on the day of theyyam all the family members are expected to see the performance. Hence it demands family reunion. Another striking factor is that Theyyam is always performed by people who belong to lower strata of society like Vanan, Malayan, Pulayan, Velan, Panan, etc.....The savarnas can only sponsor theyyam. This also claims for social togetherness. Each theyyam ritual is conducted with such high esteem that it is performed by people chosen and recognized by the community. The general procedure is that the Tantri or Priest of the temple will officiate the person at Kalari. Theyyam dancer (Kolakaran) is the one who performs the theyyam dance. The drummer is given the title of "Thudikaran" or "Chendakkaran" and the one who holds the light is known as "Muchutukaran".

There are almost 40 kinds of Theyyam. Let me list some of them.

1. Taipparadevatha
2. Vettakkorumakan
3. Kalariyil Bhagavathi
4. Oorppazhachi
5. Kannangat Bhagavathi
6. Dharma Daivam
7. Vishnumoorthi
8. Gulikan
9. Kadirooran
10. Pottan Theyyam

Theyyam actually refers to Daivam. Here emphasis is given to common man's problems. The belief that any committed evil will be observed by the theyyam sets limits to people's actions. It also gives high respect and reverence to this artform. Each theyyam is done by different communities in accordance to their lifestyle and customs. The highest philosophy of Advaita can also be experienced in this rich temple art form.

Theyyam focuses on the life of the downtrodden sections of society. It raises its voice against the social evils. This is evident from the parables of Neeliyar Bhagavathi, Vishnu Moorthy and many others, where injustice is questioned. To present such an art form efficiently requires great skill and expertise. Hence, the appearance of the artist is a significant factor.

Vibrant but common colours, used in the make-up of Theyyam, is also one of its highlights. The primary colours, red, green and yellow are mostly used in Theyyam. As T.V.G.Marar said in his book 'Arts of Malabar', "It consists of the totality of its presentation-the make-up, head dress, chest witting, dresses worn and the like".



Kundoor Chamundi

The costume is different for each theyyam, as well as the colour combination used in the make-up. The head dress of the theyyam is very important and well designed. The crowning and lifting of the head dress are ceremoniously done, known as the 'Mudiyettu' and 'Mudiyirakkal'. The different design of the head dresses gives each Theyyam its divinity and uniqueness. For example, the Bhagavathi Theyyam has round mudi and Kalari Bhagavati has slightly conical and elongated mudi. Next is the 'mukkezhuthu' or face writing which itself is an indigenous art form deeply rooted in the culture of Malabar. This is also different for each Theyyam. The body writing, especially on chest and navel region, symbolises the myths behind a Theyyam. The colours used are all derived from nature like yellow from turmeric powder, white from rice powder, and the like. This also points out the orphic interlinking of nature and god. Definitely Theyyam is the root and elixir of the culture of Malabar.

by Jayashree M P, S5 EEE

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सर्वस्य तपसो मूलमाचारं जगुः परम् ।

sarvasya tapaso mūlamācāraṃ jagubḥ param. MS.1.110

The foundation of all penance is the observance of right conduct.

VISIT TO GREAT TEMPLES OF TAMILNADU

-Sowmya Ravidas
Sreepriya C
S5 CSE

The Students Forum for Indian Heritage (SFIH) at Amritapuri Campus organizes trips to historical places every year. This year, in the month of June, we had the good fortune to visit some of the most famous temples in Tamil Nadu – at Madurai, Rameshwaram, Trichy and Tanjore. This trip, like last year's, was awesome, exciting and a wonderful learning experience.

Our first halt was the auspicious Nupura Ganga Theertham near Azhagar kovil in Madurai. Many people consider it sacred and it was evident in the fact that some people were even taking it to their homes. The water in the Theertham comes from a great height, and it is said that, even today, nobody quite knows where it originates from.

Our next stop was the famous Madurai Meenakshi temple and here we saw the 1000 pillars Mandapa, also referred to as 'Aayiram kaal Mandapam'. The architectural splendour of the structures built by our ancestors enthralled us. Here, we also saw the Saptaswara pillars similar to the ones we had seen at Hampi during one of our previous trips. Although the architectural splendour is captivating, it saddened us to note that it is not maintained very well.

The temple, although of complex structure, is extremely beautiful. We went in through the West tower and came back from North tower. We also sang bhajans inside the temple. This temple has two main shrines-one of Madurai Meenakshi, and the other, of Lord Shiva. Meenakshi is regarded to be the presiding deity here.

On our way back from the Meenakshi temple, we stopped by Ramana Maharishi's ancestral home. This is a place frequented by spiritual seekers and some tourists too. The whole house was engulfed in silence, making the atmosphere conducive for meditation. We also meditated for a while. We then went to the terrace of the house to spend a few moments at the very place where the Mahatma had had a 'near death' experience and there after became a realized master.

The next day, we went to Rameshwaram. The Rameshwaram temple was one of the major highlights of our trip this year, with its 22 wells. We even bathed in all of the 22 wells – a very invigorating experience! Each of the Theerthas have different properties such as its own unique characteristic taste and temperature. The last Theertha, called Kodi Theertham is the Ganga Theertham. After taking a dip in all of the 22 wells, we really experience a feeling of total purification. We feel absolved of all the sins that we have committed, consciously or otherwise.

When you visit Rameshwaram, do remember to read the extract of Swami Vivekananda's speech written on the sides of the doors at the entrance. Few words from the speech:

"He who sees Shiva in the poor, in the weak, and in the diseased, really worships Shiva; and if he sees Shiva only in the image, his worship is but preliminary. He who has served and helped one poor man seeing Shiva in him, without thinking of his caste, or creed, or race, or anything, with him Shiva is more pleased than with the man who sees Him only in temples. Those who serve the servants of God are His greatest servants."

From Rameshwaram, we moved on to Dhanushkodi. Dhanushkodi is an island between India and Sri Lanka. It is just 31 km from here to Sri Lanka via sea route. Here, we visited two places. One is the town of Dhanushkodi that was totally devastated by a cyclone in 1964. Second, is the Sangamam (joining) of the Bay of Bengal and the Indian Ocean. It took more than twenty minutes to reach the Sangamam. The island is at a considerable distance from the main road. We travelled in a rickety tempo traveller at a pace only slightly faster than a bullock-cart. We could find vast stretches of sand on both sides and although we did see some water bodies occasionally, we could not see the ocean on our way.

The Sangamam was simply amazing. A narrow piece of land - the roaring sea with huge waves on one side, and calm waters on the other side. I compared this to the two phases of our mind - One which is full of thoughts and disturbed, the other with no waves, which is calm and peaceful. One of the elders who accompanied us, showed us the stretch of the Rama Sethu under the sea - The Bridge to Sri Lanka, believed to be built by Lord Rama, with the help of the Vanara Sena to get his beloved Sita back from the demon Ravana. We stood there for a while enjoying the sun set.

The next day we went to Trichy. Thiruvanakaval, a famous temple here, is a Shiva temple. This is one of the five major Shiva temples representing the five great elements (Panchabhutha)-earth, fire, water, air and sky. This temple represents the element of water. There is a Ganapathy idol installed opposite to that of Devi (Goddess Parvathy). The story has it that the Devi in the temple was in Roudra bhava (state of anger), and during one of Adi Shankara's visits, he installed the Prasanna Ganapathy idol right opposite to her 'Sannathy' and installed a pair of Sri Chakra Thaatanakas (ear-rings) to reduce her anger.

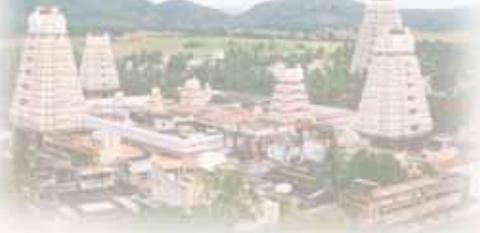
We then visited Srirangam. The temple is big and beautiful. One of the best things we liked here is Ramanuja Acharya's shrine inside the temple. They say it is the original body that is present there. It is even said that the nails and hair on the shrine are still growing.

The next day, we started our journey to Tanjore. We visited the renowned Brihadishwara temple. "Brihadishwara" literally means big temple. This temple has the second largest Nandi in the world. The top of the Gopura is carved out of a single stone weighing 80 tons. It is a wonder how the artists, workers and sculpturers carried the whole of 80 tons to the top of the big Gopura. That left us wondering... Did they have cranes? Or any other machine to lift weights as heavy as 80 tons? The accompanying guide explained to us that it is believed that elephants were used. Elephants must have rolled this over a ramp all the way to the top of the gopura. Amazing!!

In the evening, we went to Kumbakonam. We spent some time near the Mahamaham tank. Amritam is believed to have fallen into this tank. The tank is surrounded by numerous temples. This was the final destination of our wonderful trip.

All these temples are extremely busy places. Thousands of devotees flock to these temples daily for prayer and worship. But that's where the question arises-How many of us, really know in depth about our religion and the purpose and reason behind many of the sacred rituals and beliefs? How many of us are capable of seeing only the goodness in everyone and everything around us, being true servants of Shiva?

Not every one of us is successful in this-perhaps because of the current state of the world -where there is hostility but no hospitality, crime but no courage, belongings but no beloveds, fear but no feeling, selfishness but no sacrifice and money but no values. We need peace and not pieces. Nevertheless, we can all still try seeing Shiva in everyone. I believe this attitude alone is sufficient to bring about considerable change within and around us.



उत्कर्षायापि भूतानां सम्भवन्ति विपत्तयः ।
utkarṣāyāpi bhūtānāṃ sambhavanti vipattayaḥ.
Adversity can be the harbinger of prosperity.

The world is still eagerly waiting for India to attain two-digit economic growth, which is expected by the year 2020. Can you imagine there was a period when the so-called economic superpowers of this era were far behind India in most of the economic activities? Yes, before the invasion of the British, India had a glorious period, when she dominated almost all the economic activities and this was evident in her contribution to the world's Gross Domestic Product.

The economic performance of our nation since the beginning of the Common Era (CE) indicates that India's contribution was around 32.9% of the world GDP. This accounts for almost one-third of the global GDP, while all the other countries in the world jointly contributed the remaining two-third. India and China alone contributed to 59.1 percent and the total contribution by the continent of Asia was 76.3 percent. The countries of yesteryears, with a much lower GDP, are today the economic super powers.

At that time, the great strides made by India as the world's economic super power would not have been possible without the contributions of the different sectors of our economy such as agriculture, industry and trade along with the skilled and talented citizens of those days.

Share of Countries /regions in world GDP (0 CE)

year	0 CE
Total Western Europe	10.8
Eastern Europe	1.9
Former USSR	1.5
Total Western offshoots	0.5
Total Latin America	2.2
Japan	1.2
China	26.2
India	32.9
Other Asia	16.1
Total Asia (excluding Japan)	75.1
Africa	6.8
World	100



Agriculture and food Production

Agriculture has been the mainstay of the Indian economy from the beginning of the Common Era. Agricultural scientists show that Indians cultivated wheat, barley, peas, date palms and cotton 4500 years ago.

Evidence shows that sophisticated tools like the drill plough were used by agriculturalists from the beginning of the Common Era. This instrument was first used in Europe only in twentieth century. The knowledge of the Indian farmers in protecting the fertility of the soil was appreciable. They have also acknowledged the fact that Indian farmers were well versed in retaining the fertility of the soil, even as long as 2000 years ago. They used compost and other organic manure to maintain the fertility of the soil without a drop in their yield.

Food security of our nation was also commendable during the first century CE. According to available historical evidence, neither famine nor food scarcity was experienced in India. Iban Battutah, the Arab scholar who visited India during the fourteenth century, noted that rice was sown three times a year. There existed a perfect planning technique even to conserve water. In this connection, it is noteworthy to mention that more than fifty thousand tanks were built to store rain water all over South India. The chains of tanks were so intricately constructed that the British Engineers of the eighteenth century felt it difficult to add another tank or take one out from the system. The agricultural productivity was also very high in ancient India. Even in comparatively less fertile regions, such as

Chengalpettu region of Madras city, the average productivity per hectare of the crops was nearly 2.5 tons.

Industry

India also had a flourishing industrial economy in the ancient times. Today's generation may be quite surprised to know that we had a flourishing shipbuilding Industry. The Indians had built ships, flown Indian flags, sailed across the Arabian sea and the Indian Ocean to places far beyond. Though the basic nature of Indian industry was, at all times, primarily based on individual craftsmanship, aided by members of the same family, the size of each industry varied.

During the Pre-British era, there existed various administrative departments to coordinate and control the industrial activity in the country. Some of them were the Chief Controller of Mining and Metallurgy, Chief Salt Commissioner, Chief Textile Commissioner and Chief Controller of Shipping. This clearly shows the strong industrial base that India had. In those days, weaving was a national industry that employed qualified craftsmen to manufacture ropes and cotton and silk yarn.

The available data of 1750's illustrates India's relative position in the manufacturing sector. Her contribution was almost one-fourth (24.5 percent) of the global industrial output. At the same time, the entire continent of Europe together contributed to around 23.2 percent only. India, together with China, contributed around 57.3 percent of the global manufacturing output. It is interesting to note that the third world nations alone contributed about 73 percent of the global output during the middle of the eighteenth century.

Europe as a whole	23.2	United states	0.1
United Kingdom	1.9	Japan	3.8
Hasburg Empire	2.9	Third world	73
France	4	China	32.8
German States	2.9	India	24.5
Italian states	2.4		
Russia	5		

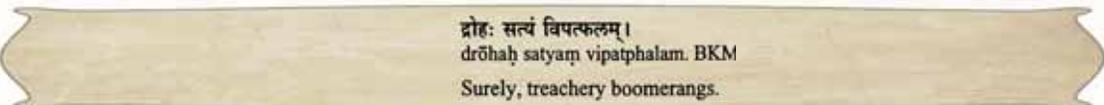
Trade

Trade was also not new to India. India seems to have enjoyed a favourable balance of trade with Rome, Greece, the Arab countries and the Far East. As a result, she accumulated large quantities of gold from other nations. Historical documents show that there was a great demand for spices, luxury goods, seashells, nuts, sandalwoods, precious stones and corals from India. This illustrates how wealth was flowing into our nation during the Pre-British era. Thus, all the available evidence indicates that Indian economy excelled in all the three major sectors - agriculture, industry and trade. During the mid eighteenth century, India was a pioneer in developing new tools and technologies when no other nation had any idea about them. We have a legacy of being an economic super power. Every Indian should be proud to know that till about 300 years ago, India was one of the economic super powers. We can be confident and hopeful that in the near future, India will emerge as an Economic Super Power.

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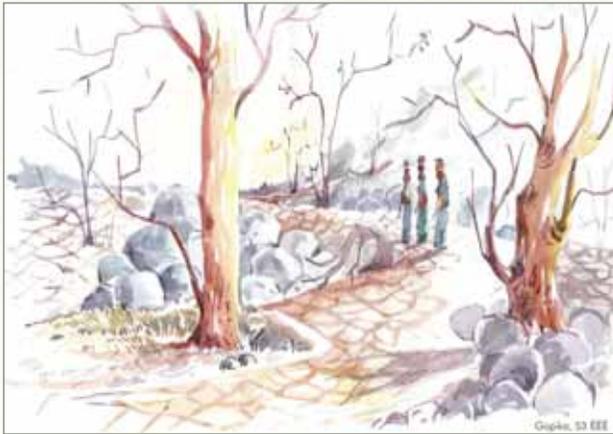
द्रोहः सत्यं विपत्फलम्।
drohah satyam vipatphalam. BKM
Surely, treachery boomerangs.

Water Management: An ancient technology still relevant

Balagovind N K Kartha(S5 ME)

One of the major reasons why life is possible on our planet Earth is because of the presence of water. Water, as we commonly say, is a wonder liquid. No other liquid has such a wide range of applications. As we all know, 70% of the human body is composed of water and this is true in the case of other organisms as well. Life has existed for millions of years on this Earth because of the presence of water.

For the past few decades, due to rapid industrial development and exponential growth of human population, the demand for water is also increasing. According to a survey conducted by



the World Health Organisation, it is found that one in three people, in every continent, faces water scarcity. It is predicted that if a Third World War occurs, it could be for water!

In India too, the cry for pure potable water is getting louder and louder despite the fact that India possesses a large number of perennial rivers. India is also a country that receives adequate rain fall every year; yet there are many places where the quality of ground water is poor. We also have a few interstate water disputes dealing with sharing of river waters. Some of the major reasons for this are agricultural needs, increasing industrialisation, large scale pollution, unpredictable climatic conditions, deforestation and lack of inadequate water harvesting techniques. As a matter of fact if the present scenario continues, by 2050, India would face acute water, food and power shortage. In short, the very existence of humans would be threatened.

Lack of effective water harvesting techniques is one of the main reasons for such an adverse water scarcity in a country like India where nature has bestowed all required resources.

Thousands of Indian villages still do not have any local source of water. By replicating the simple and inexpensive rain water harvesting techniques of ancient India, we can, to a large extent, augment the water requirements of our cities and villages.

If we look back, we can see that our fore fathers had predicted such water shortages and they had devised techniques for effective water management. Numerous inscriptions of different periods have been found in almost every part of the country with vital information about check dams, tanks and embankments and their management.

Evidence of irrigation with water harvesting systems can be found in Chanakya's Arthashastra written in the fourth century BCE. In the chapter titled 'The Activity of Heads of Department', Chanakya says "He should build irrigation systems

with natural water sources or with water to be brought in from elsewhere. To others who are building these, he should render aid with land, road, trees, and implements and also give aid to the building of holy places and parks. If one does not participate in the joint building of an irrigation work, his labourers and bullocks should be made to do his share of work and he should share the expenses but will not receive any benefits from it. The ownership of the fish, ducks and green vegetables in the irrigation works should go to the king."

Recent archaeological excavations near Allahabad have uncovered a perfect example of a highly developed rain water harvesting system dating back to the first century BCE. This system was fed by the waters of the river Ganga. During the monsoons, Ganga overflows into the nearby Nullah. A canal was dug to store the excess water. The water in the canal first entered a silting chamber where dirt gets settled down. Then the relatively clean water entered the first tank which was made of bricks. Only clean water was allowed into the second tank which provided the primary source of

water supply. There was a third tank which was circular and deep, containing a staircase. An elaborate waste weir was provided at the end of third tank. It consisted of seven spill channels, a crest and a final exit channel. Excess water moved back to Ganga after completing the cycle. In order to avoid dry tanks in summers, wells were dug on the bed of the tank to access ground water.

In western and central Himalayas, diversion channels called kuhl or guhls were built to draw water from hill streams or springs. The length of these channels varied from 1-15 km and carried a discharge of 15-100 litres/sec.

One-third of the irrigated land in Tamil Nadu was watered by ancient tanks called Eris, which have helped in controlling flood waters, preventing soil erosion and recharging ground water.

Kunds, found in the Thar Desert, are covered underground tanks with an artificially prepared catchment area to increase run-off. It was developed to supply drinking water. Khadins, an example of run-off farming were developed by the Paliwal Brahmins of Jaisalmer around the 15th century CE.

The decline in the use of water harvesting techniques began when India was colonised by the British. The British destroyed the financial resource base of the Indians and their internal capacity to manage their natural resources. They destroyed all available indigenous technologies that did not benefit them.

The most recent statistics reveal that India has a population of about 1.7 billion people. With the demand for water on a rise, the country will face acute water shortage unless water harvesting techniques are implemented effectively. Therefore, a revival of traditional water harvesting systems is very essential today. Even though several measures are adopted to avoid water scarcity, none of them have proved to be a success. It is such an irony that in a land where plenty of resources are available, its citizens have to live in scarcity. There is a need to improve upon the indigenous water harvesting systems so as to safeguard human life and the Indian economy.

Reference: **Dying Wisdom**

विपदः सर्वगामिन्यो दुर्लङ्घ्या भवितव्यता ।
vipadaḥ sarvagāminyō durlaṅghyā bhavitavyatā. RM.5.4.157.p246
Dangers are universal; destiny is insurmountable.

Sita: The Ideal Woman

Our country is the most unique, our culture one of the purest. Sita Devi, the epitome of all feminine qualities, is a perfect role model of how a woman should be. Sita is portrayed in the Ramayana as a very beautiful woman; but as we begin to understand her with each incident in this great epic, we realize that her beauty is enhanced by the beauty of her heart, her compassion, courage, endurance and wisdom and of the truth that resided within her. This made her an ideal woman.

When King Dasaratha, Rama's father, was forced to send Rama into exile for 14 years, Sita insisted on accompanying him, leaving behind all the luxuries that she had grown up with till then. Rama dissuaded her repeatedly describing in great detail the horrors of the wild. She persisted in her demand to go with her husband. She used threat, persuasion, entreaty, preaching of duty, exposition of sanctity to finally convince him to take her with him. She truly believed that wherever Rama was, that was where she should be. This shows her intense devotion to her husband, her strong sense of morals and her determination to do what is right. The women of today have a great deal to learn from Sita Devi!

Another important incident which gives us insight into Sita's character is when Maricha appears in the form of a golden deer and enchants her. Rama had gone on errands leaving Sita in Lakshmana's care. When they hear Rama's cries a while later, Lakshmana, who is fully aware of Rama's capabilities tells Sita that it is a trap. However, an anxious Sita refuses to believe it and tells Lakshmana to go in search of Rama and save him as he may be in danger. Her intense love towards Rama, made her say things she herself regretted later. Her anger and undue expressions were a result of love, devotion and concern she felt for Rama.

Even when Sita was under great distress while being abducted by Ravana, she showed great presence of mind. While flying over Pampa, she saw five monkeys and thought if, per-chance, Rama passed by them they could narrate her fate if she left a clue. So she decided to drop her jewels as a clue to help them find her.

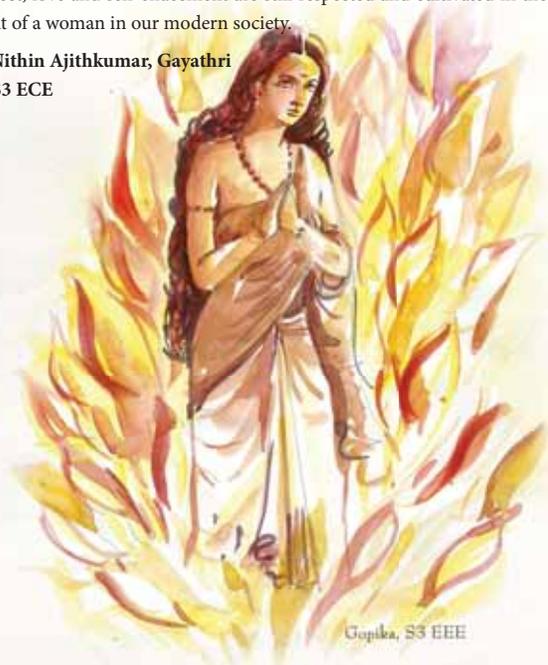
When they reached Lanka, Ravana told the Rakshasis to do everything possible to convince Sita to marry him. Besides, he also tormented her himself. He made lots of promises. Despite all this, she was strong enough to resist these torments and temptations. She pleaded with him to release her and grieved at her fate. At one point she even contemplated taking her life. However, the omens she saw at the time gave her hope that Rama would come and rescue her!

When in Lanka, Trijata had a dream which she interpreted as very auspicious and tells everyone that everything is going to be alright and that good was going to be reestablished and all the Rakshasis with evil heart were going to suffer. She advises them to be wise and fall down at Sita's feet and beg her pardon so that she may save them from the misery and punishment that would follow Rama's triumphant entry into Lanka. Sita, compassionate as she is, tells the Rakshasis that she would have pardoned them even otherwise. She promises them that if what

Trijata says happens, she would save them all. In the end, when Hanuman asks Rama permission to torture Sita's tormentors, Sita remembers her promise and tells him that these women were not their own mistresses but were acting under the orders of a dreaded monarch. She, in fact, blames herself saying that what she was enduring was a result of her past misdeeds and she asks him to leave them alone. This shows Sita's extreme compassionate and forgiving nature.

The most debated issue in Ramayana is the part where Rama accuses Sita of infidelity. Immediately after the war, when Rama orders Vibheeshana to bring Sita, she arrives anxiously and hopefully, expecting to return beside her beloved husband, only to be disheartened. When she met him, to her immense sadness, she could never find that lustre of love in those eyes of Rama. The words that followed were a stream of painful statements that would have hurt even the most callous women, let alone gentle Sita. A woman, deprived of the hope she had entertained for twelve long months, spoke with complete conviction that her heart had always been with Rama. Finally, she realizes that she is unable to convince her husband and asks Lakshmana to prepare a funeral pyre for her to jump into, as she could not bear to live with this suspicion and indignity. While jumping into the fire, she prays to Agni to save her if she had always been true to Rama, in order to prove her chastity. Sita passed this agni pariksha unscathed. Such was the importance given by Sita to honor and respect. And this was the commitment she had to her husband – pure and undeniable. Such positive qualities of Sita's personality have made a lasting impression on Indian culture and Indian women in particular and it has led the society to look upon Sita as an ideal woman. Her divinity and chastity, honor and respect, love and self-effacement are still respected and cultivated in the spirit of a woman in our modern society.

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