



Editorial

Indian history in the context of our school education often reflects the history of Indian invaders. A look upon the indigenous people and the great history of India is often neglected, overlooked or considered unnecessary. India's saga has always been interesting, vibrant and dynamic. The previous editions of Samvit have brought many glimpses of those bygone ages.

This edition deals with: The irrigation system of Deccan plateau, one of the significant topography of India. Of course the endurance of Dualatabad stone bunds shows the proficiency of ancient architecture.

A detailed account of Rasayana brings many insights about the power of Ayurveda.

How our economy is very much dependent on trade, import as well as export. You'll also learn about one of the ancient capitals of the great Hoysala Empire, Haleebedu, which was popularly known by the name Dorasamudra.

The interesting maritime ventures of our nation in the past. The Technical Education and Agricultural developments of ancient India. It is amazing to know that even weights and measurements of ancient India had variety and uniqueness.

Stories, experiences, travelogues and enlightening sessions are included as usual to inspire the readers.

We hope that you all will enjoy this issue and get enlightened.



“The guru is selfless. The guru is a repository of good qualities, such as truth, dharma, love, and compassion. Words like ‘truth’ and ‘dharma’ have no life in themselves, but a satguru is the living embodiment of these qualities. The world receives only goodness from such beings. If we make friends with someone who has bad qualities, he will be a bad influence on us; but if we have a friend with good qualities, our nature will change accordingly. Similarly, those who are with the guru become fertile fields in which good qualities are cultivated.”



“**India's noblest gift to humanity** – a belief that the unseen and intangible values are stronger and more real than the things of sense, and to this, her philosophy, with its unshaken conviction that there is One behind the many. One alone supremely real, bears witness”

Kenneth Saunders : Author of The Heritage of Asia

Rasayana – Transmutation Of Life: An Ayurveda Approach Or Adding Life To Life - Part 2

Dr. Ananth Ram Sharma & Dr Prathibha Sharma
MD Panchakarma

Somalata: A Celestial Plant

Somalata, is an excellent *rasayana* having mystical effects. It is a rare plant species having many varieties. The original plant is said to be found in the Himalayan ranges and not available now-a-days. The plant has only 15 leaves which can be seen on a full moon day. From the next day onwards, the leaves start falling, one leaf each day, until the new moon, when the plant is shorn of all leaves, the cycle then starts again, with one leaf appearing on the plant each day. Its juice -- somarasa -- is extracted with a gold needle and is used in rituals like *Somayajnya* and *Rasayana* treatment.

Method of Administration of Soma

Soma Juice is given in the morning in the dose of 160 ml

- Day 1: The patient suffers vomiting off and on the whole day. Then on the same evening cooled milk after boiling is given.
- Day 3: Loose bowels with worms occur.
- Day 4: Swelling of whole body occurs and worms come out of the body.
- During all these days the individual should be only on milk diet.
- Day 7: The person becomes depleted of muscles and skin and only bones remain.
- Day 8: Cracks in skin occur & hair and teeth fall off.
- Up to 16th day a bath with decoction of *Soma* is given along with *Anu Taila* (Ayurveda oil preparation) massage.
- Day 17: New teeth start appearing.
- From this day onward up to 25th day *Yavagu* of milk (Milk Porridge) and rice are given.
- Thereafter new black and lustier hair and reddish nails start growing.
- By the end of one month the skin becomes bright and full of luster.
- Thereafter the patient is moved from the inner to the outer chambers and then out of the shelter.

Benefits of Soma Therapy

- A person lives for ten thousands of years
- Obtains a new body
- Obtains a power like hundred elephants

Amalaka Rasayana

Properly ripe "Palaasa" tree is cut off leaving the bottom to stay. The inner part of this is scraped off to about two feet length and is filled with ripe *Amalaki* (Indian Gooseberry). This is covered with a lid made of *Palaasa* itself. Then it is fully enveloped with *Darbha* grass from top to bottom. It is then smeared with mud of lotus pond. Cow dung cakes are put over it and are burnt. When the *Amalaki* is properly cooked it is taken out. From that, quantity equivalent to that of one time meal is taken, the seeds are removed, mixed with Ghee and honey in different proportions and administered. Milk should be taken as drink.

A practical true story from Kerala

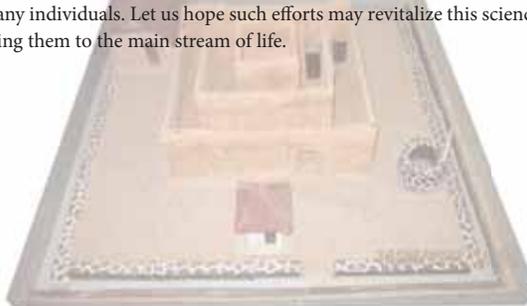
Amalaka Rasayana was administered to Poomulli Vasudevan Nemboothirippad under the supervision of his brother Poomully Neelakandan Namboothirippadu ("Aram Thamburan") and great "Vaidyamadhom Valiya Acchan" Namboodiri. One of *Thamburan's* disciple has narrated the story of *Kutipraveshika* done to Poomulli Vasudevan Nemboothirippad as follows, "For the *Rasayana* treatment given to Poomulli Vasudevan Namboodiripad shelter based on *Vastu* was not constructed. It was done in a similar kind of room at the entrance of their traditional bungalow. Namboodiripad who suffered from *Prameha* (diabetes) was administered with *Amalakarasyana*. After the Purification after he became strong enough he was taken to the shelter. I remember being told that *Rasayana* was given in the quantity of food

twice a day. As after drink plenty of milk was also used. Milk is very important during administration of *Rasayana*. It enhances the effect of *Rasayana*. It is instructed in *Amalaka Rasayana* to take plenty of milk. The patient was not given any food. The reason must be that there is no mention about food in *Amalaki Rasayana*. Though the formulation is slightly different, Charaka instructs to avoid food in *Amalaki Rasayana*. This must be the reason for not giving food to him. Similarly *Nagabala Rasayana* is also advised to be taken avoiding food for one year. Only milk is recommended in *Nagabala Rasayana*. It is a law that while taking *Amalaka Rasayana* cold water should not be touched even with hands. Therefore, only warm water was used for all purposes. There was no bathing. Instead, sponge bath was allowed. Five days after commencement of *Rasayana* the patient started vomiting excessively. There were blood stains. In faeces too, blood was found. Normally, everyone will vomit. It happens due to the non availability of accustomed *Rasas* (tastes) and serving the unaccustomed. Though the treatment became a controversy, treatment was continued. After four days the vomiting subsided and normal state was reached. Stool examination was done regularly every day. Early morning sample of stool should be examined. Correct details can be traced out only if the stool is kept in water. Otherwise due to reaction with air outside it becomes black and rough. It is then difficult to trace out. Initially, the samples were normal. Stool started loosening after fifth day. By the eleventh day, it was white in colour and was very much lubricated. It was continued for one month. The rest period was started next month. *Rasayana* was stopped and other regimens were continued. During resting period boiled *Shashtika/ Navara* rice (special variety rice) was taken with milk. In the last fifteen days occasionally he was exposed to external atmosphere. Occasionally gazing through the window and at the mirror the regimens were attuned to that of *Vata and Atapa* (air and light). The suitable diet for that was also gradually introduced. On the tenth day after treatment, an "Avadhuta" happened to come to the house. Standing at the entrance he stared at Namboodiripad, who was standing in the verandah at the entrance of the bungalow, without winking the lids. When asked the reason for staring he replied that he had never seen such a beautiful structure and the luster of the face till then that "shines like the sun". He who had suffered from diabetes now got relief from the disease and lived for a long time. At the time of death his age was more than seventy. Still he was not much affected by graying of hair or wrinkles.

Revitalization

Kutipravesika is a treatment nobody has dared to do. If the teeth, nail etc fall off as told in *Amalaka Rasayana* and do not come back what would be the plight? The physician should foresee the dangers and the anti measures for that. He should also make the patient aware of the procedure and complications. Mistakes are likely to occur while deciding the *Rasayana* according to the individual and according to the patient. For that scientific knowledge is highly essential.

Kutipraveshika is a treatment procedure that was erased from the practical field because of these factors. But here and there some efforts are made by many individuals. Let us hope such efforts may revitalize this science and bring them to the main stream of life.



Ancient Indian Maritime Glory

Neha Kumari
S4 EEE

India, situated at the central point of the ocean that washes on its coast on three sides, seemed destined very early for a maritime future.

"The representation of ship on a seal indicates maritime activity, and there is enough evidence to show that the peoples of the Sindhu valley carried on trade not only with other parts of India but also with Sumer and the centers of culture in Western Asia, and with Egypt and Crete."

-R. C. Majumdar (Historian)

The Indian subcontinent is bordered by the mighty Indian ocean, with the two seas, the Arabian sea and the Bay of Bengal opening into it. These seas have been the arena of our maritime activities, from the remote past. India's geographical location and the thousands of kilometers of coast line, contributed to her development as a major maritime power with a vibrant economy and overseas trade.

To the West, the Arabian Sea separates India from the Arabian peninsula, while the Bay of Bengal in the east intervenes between Burma, the Malay peninsula and the archipelago. The Arabian sea, also known as the *Ratnakara* of the ancient Indians, has been the passage for Indian, Phoenician and Arab vessels from ancient times and brought the westerners into contact with India. On the other hand, across the Bay of Bengal, early Indian settlers and adventurers spread their culture in the South East Asian countries. The history of Burma, Malaya, Indonesia and Indo China is indelibly linked to the trade and cultural missions that went there from India.

The prevailing monsoon winds and the emergence of the Egyptian, Mesopotamian and Indus valley civilizations saw the Indian Ocean area gain prominence for maritime activities. Till the coming of the European seafarers, no foreign power had invaded India from across the sea; but India had made its presence felt in commerce and cultural missions in all the countries bordering the Indian Ocean region.

Boats and ships, ship-buildings etc.,

The Indians built ships, navigated the sea and monopolized the international trade both by sea route and land route. Indian literature furnishes evidence with innumerable references to sea voyages and sea-borne trade and the constant use of the ocean as the great highway of international intercourse and commerce.

Shipbuilding is the construction of ships and floating vessels. It normally takes place in a specialized facility known as a shipyard. Shipbuilders, also called shipwrights, follow a specialized occupation that traces its roots to a pre recorded history. Construction of boats is a similar activity called boat building. Ships and boats of India were built of wooden planks (daru phalakani) bound together with ropes, a were manipulated with oars and rudders, and some of them had masts carrying sails. We can get a clear idea of ship building from a description of the vessel carrying the tooth relic of Buddha to Ceylon. It refers to the ship, "firmly constructed with planks, sewed together with ropes having a well rigged lofty mast with a spacious sail and commanded by a skilful navigator." "The vessels of ancient India can be divided into two categories, ordinary (samanyas) and special (visishta), mainly on the basis of the dimensions-length, breadth and height. The ordinary class was still subdivided into ten sub-classes. The ships of that time too were decorated and furnished in different ways and colours for proper identification according to their purpose and use. These vessels were classified as *sarvamandira*, *Madhyamandira* and *agramandira* vessels. The first type is recommended for transport of royal treasures, horses and women, the second for pleasure trips and the last for dry weather and as war ships.

Buddhist literatures the *Mahavamsa*, the *pitakas*, the *nikayas*, the *jatakas* and many more refer to ocean going carriers capable of accommodating hundreds of passengers and crew. Jain works especially *Avasyakacurni* and *brihatkalpasutrabhasya* are full of incidents concerning voyages over the sea and contain nautical jargon for moving forwards or backwards etc.. Even the epics of Ramayana and Mahabharata and the puranas viz., *matsya*, *varaha*, *markandeya* etc. refer to voyages. Apart from the Indian sources, several foreign travelers and geographers have recorded their

observations which are of immense historical value in the assessment of the maritime activities of the Indians of which *Periplus of the Erythraean Sea* or *Periplus of the Red Sea* written in Greek is the most important, whose author is still unknown.

Routes, ports of call, emporia etc.

Ships from the Red Sea or Persian Gulf ports reached India by three distinct routes, they could sail (1) to Barbaricon at the mouth of the Indus (2) to Barygaza (modern Broach) on the Narmada and (3) to the Tyndis and then to Muziris on the western coast in Kerala.

Ships to the South-East Asian countries and to China set sail from Barygaza, Masolia, Polura and Tamralipti. Restricted excavations at the Broach town-site near the river Narmada by the Archeological Survey of



India revealed a mud rampart in the earlier period which in historical times was heavily revetted with large-sized bricks. Ships from the Red Sea ports sailed direct to Muziris and this was an important trading post in the west coast. Camara of the Periplus has been identified with the ancient Puhaar (modern Kaverippattinam) on the banks of the river Cauvery at its confluence with the Bay. The City was divided into two parts, Maruvurpakkam and Pattinapakkam, separated by a garden of trees. Recent excavations in and around Kaverippattinam has confirmed that this place had an emporium. Poduca on the Eastern coast has been identified as Arikamedu, a suburb of Pondicherry (present Puducherry). Tamralipti on the mouth of the Ganga was an important Trading Centre on the east coast. It was the terminal post for east-bound ships. Excavation on this site by Archeological Survey of India revealed a sequence of four periods ranging in time from the neolithic to eighteenth nineteenth century. During the first-second centuries, Rouletted Ware sherds (has a flat base and tapering profile, and is ornamented on the interior of the sides with a row of stamped medallions between bands of multiple incised grooves on the inside of the base) were found which were an evidence of Roman contact. Indian traders would set sail from the port of Mahabalipuram, carrying with them cinnamon, pepper and their civilization to the shores of Java, Cambodia and Bali.

Settlements and naval expeditions

There is abundant evidence, both literary and otherwise, regarding the early Indian settlements in the South-East Asian countries. The settlers here had no political allegiance to their motherland. Nor was there any mass movement of population from India to these countries. There were many factors involved in the expansion of Indian culture across the sea in the South-East Asian lands and some of them are – (i) English oversea merchantmen getting settled there and acquiring a local family. (ii) adventurous spirit dominant among a few settlers (iii) religious and missionary zeal of the Hindu and Buddhist teachers (iv) navigational expertise of the Indians serving as a means to achieve this end. And (v) outcome of military expeditions. Indian cultural impacts reflected by all the epigraphs in Sanskrit, the earlier ones being the Pallava Grantha and the pre-Devnagiri, the prevalence of Sanskrit topographical names, some of which still survive and the influence of Indian art and architecture in the Far East.

Continued in the next page

Amma Answers

Q- What do we mean by 'real' service to the master?

A- When we talk about a true master, we don't mean just an individual; we mean the divine consciousness, the truth. The master permeates the entire universe. We need to understand this, for only then can we advance spiritually. A disciple should never be attached to the physical body of the master. We should broaden our view so that we look upon every sentient and insentient being as the master, and thereby serve others with devotion. It is through our bond with the master that we acquire this expansiveness. The mind of a disciple who matures by listening to the master's words and watching the master's deeds rises to that plane without the disciple being aware of it. On the other hand, the service rendered by a person who desires physical proximity to the master, for purely selfish reasons, is not real service to the master.

The disciple's bond with the master should be such that the disciple feels it is impossible to stay away from the master even for a moment. At the same time, the disciple should be expansive enough to serve others and should do this to the point of forgetting oneself. He should serve others with the attitude that he is serving the master. Only such is a true disciple has absorbed the real essence of the master. The master will always be with such a disciple.

When we see a mango tree, our attention is not on the tree but on the fruits. Yet, we don't neglect to take care of the tree. Similarly although a disciple knows well that the master is not the body but is truly the all-pervasive consciousness, the master's body is precious, and personal service to the master is dearer to the disciple than his own life itself. As a true disciple, one finds that one is ready to give up even one's life for the sake of the master. His concept of the master is not confined to the limited individual. He sees his master in all living things. And thus, he actually feels that to serve anyone is to serve the master. The true disciple gets contentment and happiness from this.

Q- Isn't it true that some of the sages used to get angry?

A- Their anger destroyed people's egos. Their anger was an expression of their compassion. The anger of a sage cannot be compared to the anger of an ordinary person. The purpose of the master's anger is to remove the *tamas* from the disciple. If a cow is chewing on your plants and you approach the cow, gently pleading, "Dear cow, please do not eat my plants. Please go away", the cow will not budge. But if you shout at it sternly, it will move. Your sternness turns the cow, which lacks discrimination, away from the "wrong" it is doing. Similarly, the anger of a perfect master is just superficial; it doesn't come from within. The master's anger is like a soap that cleans the disciple's mind. The master's sole aim is the upward progress of the disciple. A burned rope or a burned lime peel appears to have a form; but it crumbles the moment you touch it. The anger of a sage isn't real; it is a deliberate act meant to turn others to the right path.

Q- If the master is one who has not attained self realization, what is the benefit of surrendering to him? Will the disciple not be cheated? How can we determine whether a spiritual teacher is realized or not?

A- This is hard to say. Everyone wants to become the biggest movie star at the moment. People will do anything to achieve this. They try all forms of imitation. Similarly, there are many people who want to pose as masters when they see the honour and respect accorded to a spiritual

master. If we were to list the signs of a perfect master, it would make it easier for those who are eager to take on the role of a master; ordinary people would be swindled by their charades. So it is best not to elaborate on the nature of a *satguru*. It shouldn't be discussed publicly.

The scriptures have given certain descriptions of the characteristics of a master. However, it is difficult to use the characteristics seen in one master as a criterion when trying to discern whether or not another person is a true master. Each master acts in his or her own way. However much you read and study, it is difficult to find a perfect master unless you have a pure heart. Renunciation, love, compassion, and selflessness can generally be found in all masters. But a master takes on very different roles to test the disciples. Only a pure-hearted disciple can take this. When the seeker starts searching with genuine longing and a pure heart, a real master will come to him or her. But the master will also test the disciple.

Even if a seeker falls into the hand of a false master, if the seeker's heart is pure, his innocence will nevertheless lead him to the goal. God will clear the path required for this. Instead of wasting time testing and comparing masters, it is better to pray to God to help you to become a perfect disciple and to lead you to a perfect master. Only when the intellect and the heart merge can a disciple really recognize a true master.

(page 4 continued)

Naval warfare was not an uncommon feature. A naval fleet was always ready in defence as is evident from the literature and inscriptions of the Sangam period. The Sangam works mentions that Imayavaramban Nedunjeralatan defeated his enemy in naval engagements. The most outstanding conquest of the Cholas was the conquest of Kadaram (Kedah, in Malay Peninsula) by Rajendra. In Pallava times, Mahendravarman-I's father defeated the King of Ceylon. The people who carried their civilization by the sea, to Burma, Siam, Cambodia, Indo-China, Java, and Madagascar, were great seafarers.

Passenger ships plied regularly between the Ganges, Ceylon and Malaya in the middle of the first millennium A.D. Indian settlers from Gujarat and Kalinga colonized Java, for instance, while others set out for Burma or Cambodia. Oceanic travel was well advanced in the fifth century and Indian mariners not merely crossed the Bay of Bengal at its widest point, but sailed far out into the Pacific.

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The Surat Transformation

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[Excerpts from the book 'Making Breakthrough Innovations Happen' by Porus Munshi]

"We spend our life waiting for that big opportunity, that big break. And it is there all the time – waiting for us. All that it needed was to take what we had in hand and use it to make a delta change. Look around you. Every sign of change you see anywhere has happened because some individual didn't see himself as doing 'just another job'. What can you do to make a delta change today?" Porus Munshi

For decades Surat was one of India's filthiest cities. Surat is not a small city. It is one of the eleven metros of India, with a population of nearly three million. Before 1995, forty percent of its population lived in slums, most with no drainage whatsoever. The city had always been noted for epidemics of waterborne diseases like malaria, gastroenteritis, cholera, dengue and hepatitis. The plague was no accident. Further, the Surat municipality was the oldest in the country and was infested by a corrupt, cynical bureaucracy.

Legend has it that one morning in May, The new Municipal Commissioner, S R Rao, sauntered into the municipality office, leaned against the door, took out a tobacco pouch, rolled his trademark cigarette, put it in his mouth, lit it, and introduced himself (in Bond fashion), "My name is Rao.....S R Rao." Within the next twenty months, Rao transformed Surat to be rated as the second cleanest city in India. All he asked himself was, 'how do I make a delta change?' With no additional resources, no support, no directive handed to him, he went about his 'job' and shifted the orbit of an entire city. It just shows how much can be done if someone just puts himself behind a cause. For Rao, the cause was clear- eliminate plague and transform Surat. How did he do it?

For the first month, Rao studied the problem by just observing what was happening around him. He held meetings, spoke to people and went to the field. He walked all around Surat. Ten years later, his awed colleagues still talk about how Rao covered every inch of Surat on foot. According to him, he first challenged the existing myths under which civil servants (or any of us) hide their incompetence:

- 1) Existing rules, regulations, hierarchical systems are outmoded and, therefore, we can't function effectively.
- 2) We have insufficient finances and, therefore, cannot implement anything effectively.
- 3) We have insufficient and/or unskilled manpower.
- 4) Political/administrative interference, constantly, inhibits our effectiveness; and
- 5) There is insufficient delegation of powers; therefore, we have little authority.

With that one month of observation, he had identified the fundamental issues behind Surat's problems. First Rao identified the following symptoms:

- 1) Turkism and compartmentalization, each functionary operating like a mini Turk;
- 2) Knowledge hoarding, because knowledge was power, it wasn't being shared;
- 3) Organizational politics and wars;
- 4) Centralization of powers with no delegation of responsibilities;
- 5) Schisms between the 'core' functions and the 'non-core' ones;
- 6) Treating symptoms in a knee-jerk reaction instead of treating the fundamental disease.
- 7) No 'rule of law'. Everyone functioned on personal contacts, and
- 8) A master-versus-slave mindset that treated the conservancy staff very badly.

From these symptoms, Rao identified three key areas to address at a fundamental level.

- 1) Administrative capacity building,
- 2) Financial capacity building; and
- 3) Public health engineering capacity building.

When Rao addressed these core areas, civilization, as they knew it, changed for Surat's residents. The first step was to set his internal house in order. He started with the building of Administrative Capacity. To hold people accountable for results, he had to first provide them with responsibility, with the authority and freedom to make decisions that go with responsibility. In many cases, we hand down responsibility but not the authority to take decisions. And this effectively ties people's hands. To provide authority Rao appointed all the departmental heads as Commissioners. Overnight, Surat had eleven Commissioners with the same administrative and financial powers as the erstwhile commissioner. He divided Surat Municipality into six zones, selected six of his departmental heads and appointed them as Zonal Commissioners, responsible for their mini corporations, end to end. They handled everything; taxation, personnel, sanitation, sewerage, water and so on. This brought departmental walls crashing down. The main objective was to end compartmentalization which is the bane of bureaucracy. To ensure effectiveness, he devolved both administrative and financial powers to them and held them accountable for their regions, demanding detailed work plans, road maps and clear tangible results in key areas. All the powers of the Municipal Commissioner were given to them, including financial powers to allocate up to Rs 200,000 per project without prior approval. This was empowerment in its truest sense.

Rao disbanded functional departments. Earlier there was a chief engineer, roads, who would not cooperate with the chief engineer, water, who would not cooperate with the chief engineer sewerage, and so on. Rao decided that there was no need for these functional departments and outsourced their services to private companies who were held accountable. He introduced a time-based citizen complaint redressal system

and tracked it on line. Rao also focused on the twin principals of discipline and reward: discipline from the top and reward from the bottom.

Simultaneously Rao introduced measures for building financial capacity. He did four major things:

- 1) Plugged loopholes in property taxation;
- 2) Plugged loopholes in octroi collection;
- 3) Computerized accounting, scrapped government accounting norms and introduced commercial norms;
- 4) Made each zone an independent profit center. They had to raise their own finances and deliver the services.

To bring in further accountability and transparency, Rao set up citizen committees to audit the inspectors and cross-verify their assessments. This brought in brutal transparency and when transparency came, effectiveness followed. The results were stunning: 54% increase in revenue income for the year 1995-96. In 1994-95 it was 164.7 crores and 253 crores in 1995-96!

On the health and sanitation front the results were equally staggering. Within two years of Rao's stewardship, INTACH rated Surat as the second cleanest city in India behind Chandigarh. Malaria cases came down from 22000 in 1994 to 496 in 1997 and zero in 2002!! The Surat Medical Association mentioned a 66% decrease in doctors' earnings as public health improved with better sanitation and decrease in incidence of water-borne diseases.

The population covered by sanitation increased from 60% to 95%; the population covered by protected drinking water increased to 98% from 40%; Not just this, 92 km of main roads were widened, 300 km of new roads were laid and the percentage of streets with street lights went up to 98.2%. Rao's focus on slum development also paid off. By the time Rao left, 82% of slums had been upgraded!

Your ability to succeed at an orbit-shifting mission is directly linked to your ability to tolerate frustration. Rao faced hostile politicians who tried to undercut him. They refused to let him fine citizens for littering, they refused to increase taxes, they refused to let him collect property tax annually. At every step he was blocked; but he always found a way around the blocks. Every obstacle was combated with an innovation that found a way round the rules. How much frustration can you tolerate? Orbit shifting transformations happened when Rao asked himself a single question; everyday. Ask yourself the same question, "Have I made a delta change today?" If you haven't yet, what are you going to do about it?

Rao was in Surat for only twenty months, yet his systems and results have continued more than a decade later. This is truly a city's real tribute to the 'man who transformed Surat'.

Technical Education in Ancient India

Minerva Dutta
S6 CSE

It is often remarked that ancient India was opulent. This phenomenal progress was made by India on account of its trade, indigenous industries, handicrafts, master artisans and craftsmen. Indian physicians had a great reputation and they were well-known far and wide. Its sculptors and other craftsmen were highly competent.

During the Vedic period, cattle breeding assumed wide significance and popularity, so much so that it formed an important part of Vedic education. Breeding a large herd of cattle (often thousands at a time) required the expertise and knowledge of Animal Husbandry, Veterinary Science and dairy farming. It was on account of this phenomenal development of the craft of cattle breeding, that India was regarded a country where milk and curd would flow like rivers.

Kautilya's Arthashastra mentions that the art and technology of jewellery making and glass making touched an all-time high level of sophistication. It is evident from the fact that gold, silver, precious and semi-precious gem stones find a prominent mention in the book.

The art of textile manufacturing was mastered as there existed fine fabrics of cotton, wool and silk in the Maurian Era.

All these facts speak highly of the fact that there was a sound infrastructure of technical training forming the bed rock of indigenous industries of trade and commerce.

A few technical disciplines as observed during the Vedic and Upanishad period include Metal technology, Chemical Engineering (predominantly involving the study of organic poisons), material sciences etc.

The manner in which a student could acquire this method of education was by enrolling in any of the following systems of education (enrollment was subject to constraints)

- 1) Hereditary system
- 2) Apprentice System
- 3) Guild system
- 4) Ashrama System
- 5) Gurukul System

While the first four systems are self explanatory, the Gurukul system followed a unique learning methodology. Teaching would begin with instructions supplemented by practicals. Subjects were taught for a period of 4-7 years so that a pupil could master his course.

The educational setup of the Ashrama system was an interesting one. A big Ashrama comprised of several departments (not including worship and the teaching of Vedas), namely:

- 1) The department of Royal teaching (included politics, economics and ethics)
- 2) Military Science that included strategy, tactics, organization and weapons training.
- 3) Department of Botany
- 4) Department of Astronomy
- 5) Department of Technology and Conveyance

Military Science, an important discipline of technical education in those days, had its preceptors well versed in Dhanurveda (this included all branches of Military Science). The Military education received by Luv and Kush is a good example of education imparted in an Ashram. Its quality can be judged by the fact that they single handedly defeated the entire army of lord Ram during the *Ashvamedha Yaga*, even though the army consisted of able and renowned warriors like Sugriva, Angad and Hanuman. The quality of the education imparted at an Ashram depended on the quality of the Master and students. The master's were usually saints and rishis who were moral giants.

Recently discovered manuscripts of Rishi Bharadwaj, shed light on the disciplines taught in his Ashram. These include Aeronautical Science, the science of preparation of artificial diamonds and Hydrology.

During the reign of Ashoka, in many a Buddhist and Jain works, there is a mention of various arts and vocations which were called as "Kalas". There were 64 broad categories of Kalas, chiefly,

- 1) Metallurgy
- 2) Mine Technology
- 3) Cooking Technology
- 4) Science of Archery
- 5) Military Science
- 6) Leather technology
- 7) Textile Design technology
- 8) Machine Fabrication Technology
- 9) Earth Work Technology
- 10) Machine Construction Technology
- 11) Ship building Technology
- 12) Textile Technology
- 13) Gold Technology
- 14) Dairy Technology
- 15) Weapon Manufacturing Technology

Examinations in Technical Education: The ancient Indian tradition did not consider terminal examinations to have any importance in regard to judging the extent of knowledge of the subject attained by a student.

In technical training, a student remained under the continuous supervision of the teacher. The teacher hence got ample opportunity to observe the student's knowledge. The teacher was well aware of the plus points and the weak points of the student with respect to a discipline, thereby enabling him to give more emphasis on that aspect, including re-explanation of the fundamentals of the topic concerned. The teacher would proceed to the next topic only when the first one was covered and imbibed adequately by the student.

In short, it can be stated that the education system that prevailed in ancient India helped mould an individual, not only to develop his technical skills, but also to live a moral life – a life soundly embedded in the principles of *Dharma*.



Surgical training of pupils by performing operations on fruits, gourds, watermelons, cucumbers etc.

Reference: Examinations in ancient India - S Narain

Sagacious Water Harvesting in Ancient India

(The example of The Deccan Plateau)

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The Deccan plateau constitutes the whole of the South Indian table land. This includes most of Maharashtra, Karnataka and parts of Andhra Pradesh. The elevation of the hills is lower in the north and increasing towards the south where the mean height is about 1500-1750m. The mean average rainfall in this region is again higher in the west and is less in the east. The region receives rainfall both from the southwest and the northeast monsoons. Rainfall has been the principal source of water for irrigation in this region for many centuries.

During the pre-British days, the rulers of this region built very efficient irrigation systems. Some of these are still in good condition. One of the most fascinating pieces of engineering can be found in the masonry check dams that were built around water bodies. Some dams, made of stone, are strong even today; like the bunds built in Daulatabad.



Bandharas, keres and kattes

Rivers and streams that flow in the Deccan plateau are Godavari and Indravati in the north, Tungabhadra, Krishna and Bhima drain most of central Deccan, and Cauvery in the southern most part of the Deccan. The rainfall in the region varies from roughly 1300 along the coastal side of Western Ghats to about 500 mm in the central region of the Deccan plateau. The streams, tributaries and distributaries of these rivers cover a wider area. To harvest this water, *bandharas* are constructed across these channels, either to divert or to impound water. These structures hold water for a couple of months after the rains and need regular maintenance. Silting and washing away of the *bandharas* happen almost yearly and work needs to restart.

Construction and maintenance of these channels involve cost and effort. Thus the community irrigation system came into existence around 300-400 years ago, what has come to be known as the *phad-irrigation system*. Here the area under cultivation was divided into *phads* (regions). Based on its proximity to the water source the crop to be cultivated is decided. This is not an individual decision; the village elders, the land owners and the irrigators, based on the rainfall and predicted rains decide which crops to grow in which *phad*. This decision is binding. Also the irrigators do not hold land. Their job is to let water to the fields periodically as required by

the crops, which again is a decision by the *Baghyat* (irrigators') Committee. The individual farmers cannot influence the decision. This way every *phad* gets the opportunity to grow sugarcane, which is the principal cash crop. In times of scanty rainfall, some *phads* in the lower reaches of the water is left fallow. Usually the farmers owned land in all the *phads* to ensure maximum profit as well as to keep the system alive. This system was completely managed by farmers.

Keres and *kattes* (tanks and reservoirs) as they are known in Karnataka were used to store water for irrigation. They are fed mainly by rivers and rains and sometimes from water channels at a higher elevation. Building such tanks was the responsibility of the kings or the government. Once the tank is in place, a caretaker is appointed to maintain the tank. He keeps alert regarding any damages happening or routine repairs that need to be done.

Apart from the water needed for irrigation the city is usually surrounded by wells and a *kund* (tank) is present in the center of the town to cater to the water needs of the society. Both deep and shallow wells were built to provide for water. Water channels were constructed to bring in water from the tanks to some places. These tunnels or water passages have air shafts along the way, which can facilitate cleaning of the channel as well.

In Karnataka the temples and large establishments were usually built along with a tank. Water was revered and taken good care of. The rich and capable persons usually donated money towards the construction of such public baths and tanks for the use of the society.

Post Independence the idea of a community irrigation

and water maintenance system has become obsolete. With the grant of rights to the underground water to the landowners, the number of borewells has increased, which was not allowed in the *phad* system. With subsidy in electricity the large farm owners no longer needed the services of tanks, but this has affected the smaller farmers who cannot afford the infrastructure individually. This has led to the decline and deterioration of tanks and reservoirs. The capacity of these tanks has also reduced due to silting and dumping of untreated domestic waste. Industries located close to rivers and large water bodies have added to the pollution.

With the expansion of cities in all directions the lakes and tanks which once could supply water to the cities are getting dried up. The ground water is being exploited to more than 100% in some areas. There are, however, still a few reservoirs which continue to feed the cities, but frequent maintenance is needed to keep them silt free and clean. Water shortage is a grave issue and it is getting worse by the day. The age old traditions of water harvesting needs to be revived if humanity is to leave something of the planet for the future generations.

Reference: "Dying Wisdom" by Anil Agarwal and Sunitha Narain

The Sustaining Status of Agriculture in Indian Civilization

M Siva Sai Reddy
S6EEE B

Our ignorance of modern agricultural system is a matter of greater concern today, than how much more or little we know about our ancient agricultural system. We talk about the world having come nearer to-day due to newer systems of communication. All success stories of green and white revolutions are not a global phenomena in the true sense but a success story of a few advanced countries or of a few States in a country or a few districts in a State. Some portion of the civilization is suffering from the hazards of over-eating while a much larger section of the civilization has hardly anything to eat. It is those, who have produced more to consume more are responsible for the present global ecological problems. We have more than 20 million hungry people in Africa, not due to any natural disaster, but due to man-made destruction of natural resources.

One of the things which makes this globe a distinctive planet in this universe is continuous availability of water, a vital prerequisite for existence of life. Ever since man appeared on the surface of this earth he must have understood the importance of water as is apparent from the fact that all the ancient civilizations known to history and archaeology thrived on the banks of rivers. All the early human civilizations, Egyptian, Mesopotamian, and Sindhu-Saraswati civilizations, developed in the river valleys.

As the birthplace of Indian culture, the towns of the "Indus Valley" represent an important and rich source of information concerning urban development in the Indian subcontinent. The Indus River is one of the



largest and most important rivers in south central Asia. From its source in the Himalayan Mountains to its terminus in the Indian Ocean it traverses a course of over 2,000 miles. For millennia it has been an essential route for travel, trade, and communication and has been the source of much of India's agricultural production. The valley which surrounds the Indus River has witnessed the birth and growth of many cities.

Successful farming requires careful planning for all farming activities including management of water resources. From the point of view of history of Indian agriculture, it is therefore, important to know how in ancient India rainfall, rivers, and other water resources were utilized by cultivators, what was their knowledge base, and what were their methods and means of water harvesting and conservation to ensure continuity and dependability of water supply for farming.

Pre-Harappan and Harappan cultures in India developed along the river Saraswati and later these developed into what is called Pre-Vedic period and Vedic cultures. Saraswati, also called Sadaneera (ever flowing), is mentioned in Rigveda. During this period Saraswati has been a mighty river and very strong cultures could develop because of sustained supply of water for domestic purposes and for irrigation. It is that due to some upheaval in the Himalayas, the source of water to the Saraswati was diverted and the tributaries of the river Sindhu began to receive more water making Indus a mighty river. It is later in the Vedic period that the land inhabited began to be called Saptasindhavah, the land of seven rivers. The seven rivers included the five rivers of Punjab (land of seven rivers), viz., the Sutudri (Sutlej), the Vipas (Beas), the Parushini (Ravi), and the Askini (Chenab). It appears that when Saraswati dried up, Indians

began to move in search of water. It was King Bhagirath whose efforts brought the Ganga into the plains of India and strong cultures in the Indo-Gangetic plains developed.

Before we examine the status of agriculture in the Vedic period, let us review the status of agriculture during the period preceding 1600 BC.

Chalcolithic period: In the Chalcolithic period (2295-1300 BC), Harappans had reached a high state of culture. They used implements such as sickles, saws, knife blades, spears, axes, arrow heads, and daggers made of bronze, and copper fish-hooks. Specialized occupation besides agriculture developed and these articles were produced by skilled craftsmen such as coppersmiths, carpenters, jewelers, goldsmiths, stone cutters, and potters. Trade with other developed cultures, particularly Mesopotamia flourished and some items such as metals, timber, and precious stones were imported (Wheeler, 1968).

Harappans cultivated bread, wheat (*Triticum aestivum*), barley (*Hordeum vilgare*), sesame (*Sesamum indicum*), peas (*Pisum sativum*), melon, date palm etc. Harappan culture covered a very vast area in North India with very strong settlements at various sites in Jammu and Kashmir, Punjab, Haryana, Rajasthan, Gujarat, Uttar Pradesh, and Madhya Pradesh. One of the most important findings has been that the inhabitants of Ahar, a Harappan site in Udaipur, used to have rice. This rice had long-seeded grain and perhaps was the ancestor of the fragrant basmati rice. Wheat and Jowar (*Sorghum bicolor*) were other food crops.

Other Neolithic (7500-6500 BC) and chalcolithic (2295-1300 BC) settlements have been found in the valley of Tons river in Uttar Pradesh by Mesurier in 1860; at Bellary in South India by William Fraser in 1872 (Randhawa, 1980), and at several places in Andhra Pradesh, Karnataka, Tamil Nadu, and Maharashtra. The main crops under cultivation were jowar, bajra (*Pennisetum glaucum*), and ragi (*Eleusine coracana*). Minor millets such as kangni (*Setaria italic*), kodon (*Paspalum miliaceum*), and sannuk (*Enchinochloa frumentacea*) were also cultivated. Other crops were kulthi (*dolichos biflorus*), mung (*Vigna radiate*), mash (urd), masur (*Lens culinaris*), linsed (*Linum ustatissimum*), and castor (*Ricinus communis*). Ber (*Ziziphus nummularia*) and amla (*Emblca officinalis*) were also grown (Vishnu-Mittre, 1974).

Evidence of earliest use of silk has been shown by A N Gulati during this period from the burial site at Nevasa (Randhawa, 1980). Evidence of the species of trees which were used by the Neolithic and Chalcolithic people has been provided by the charcoal recovered from some of the archaeological sites. These indicate use of wood of teak (*Tectona grandis*), Acacia sp., and *Ziziphus mauritiana*. The wood of *Ziziphus mauritiana* was used for making moosal (mortar) by the Harappans and it is interesting to note that similar use of this wood was evident in South India. This selective use of the wood indicates the knowledge of the Neolithic-Chalcolithic people, of the characteristic qualities of the wood.

In the early Vedic period (1500-1000 BC), there is no mention of rice and cotton, though these were cultivated during the Harappan period. In the later Vedic period (1000-600 BC) agricultural implements were improved. Iron ploughshare was used and many agricultural practices are evident. The people possessed a fair knowledge of the fertility of land, selection and treatment of seed, seasons of sowing and harvesting, rotation of crops, manuring for increased production, and other agricultural practices.

"Agriculture in Ancient India", being simple and sustainable, need to be respected, encouraged and maintained. They carry a great deal of historical significance besides contemporary relevance. Lastly, let the journey stop here with the saying - "History Repeats Itself" in and through the ages and it lasts long.

References: J P Agnihotri, C. (2000) Status Of Agriculture in the Vedic period. (S L Choudhary, G S Sharma and Y L Nene), Ancient and Medieval History of Indian Agriculture, (May-June, 1999) P.28.

Note: The dates in BC given above are still under discussion and research. Scholars agree that these could be put back several centuries.

The Thrill of a Trip To Kanyakumari

Aashritha L S & Aparna Shreedhar(S2 ECE)

Kanyakumari, the southernmost tip of the Indian subcontinent was always a place we wanted to visit. We got the opportunity as a part of the educational trip from Amritapuri Campus. We started our journey, early morning, on Feb 15th. We reached the Vivekananda Kendrabhy around 9 am. After a hearty breakfast, we were taken to the Vivekananda Museum. There we read various inspirational quotes, speeches and stories regarding this great Indian monk. Born into an aristocratic Bengali family of Calcutta, Vivekananda showed an inclination towards spirituality. He was influenced by his guru Sri Ramakrishna from whom he learnt that all living beings were an embodiment of the divine self and hence, service to God could be rendered by service to mankind. We also learnt a little more about Swamiji and this place.

During his tour in India, on foot, he reached Kanyakumari on Christmas Eve, 1892. He visited the temple of Kanyakumari (Parvati) and prayed and meditated for a while. He then came out and stood on the sea shore, gazing at the sea. Some two furlongs away he saw two large rocks. According to the Puranas, the larger and farther of these two rocks is the one that has been sanctified by the blessed feet of Goddess Parvati who under the disguise of Devi Kanniya did a penance on one leg to attain the hand of Lord Shiva. Swami Vivekananda was seized with the desire to reach those rocks. But since he had no money to pay for a boat ride, he plunged into the roaring waves and swam to the rock. The sea was rough and shark infested; but, Swamiji swam safely across and stepped onto the rock. He spent three days and three nights on that rock. There, sitting on the rocky tip of India, he passed into a deep meditation on the present and future of his country. With the vision of a seer, he understood why India had been thrown from the pinnacle of glory to the depths of degradation. He perceived the realities and potentialities of Indian culture. It was during this period of meditation that he felt that he should go to Chicago, talk at the meet and do something to lift India in the eyes of the world. Just as the Bodhi tree was to Buddha, this rock was to Swami Vivekananda. Hence this rock was named after him as "Vivekananda Para", and has presently become a tourist spot.

We went to the Vivekananda Para by boat. It was a wonderful experience. We felt very calm and serene. The view and the breeze were simply glorious. We worshipped the Devi's "Padam" and then went to see the Vivekananda Rock Memorial. We paid our tributes to Swami Vivekananda, Sri Ramakrishna Paramhansa and Sri Sharada Devi. There was a meditation hall with a calm atmosphere where we meditated for a while. After having seen these places and clicked a lot of pictures, we left for the mainland.

Next we went to the Kanyakumari temple, where the main deity is "Kanyakumari Devi". This was the first Durga Temple created by Lord Parasurama and is also one among the 108 Shakthi Peethas in the world. Devi KanyaKumari, that is, the "Virgin Goddess", is an aspect of Parvathy. The beautiful image of the Goddess, in resplendent attire, with a garland in her right hand shows her doing penance as she waits for Lord Shiva to come. The Goddess bestows on devotees immense spiritual energy and peace of mind. One specialty of the idol is her diamond nose ring. The sparkling diamond nose-ring of the deity is said to be visible even from the sea. The temple's legend says that the nose ring was obtained from a king cobra and that light reflects off it so brightly that once an ancient mariner mistook it for a lighthouse. Sailing his ship towards the beacon, he was wrecked upon the KanyaKumari rocks. In order to prevent such a tragedy from happening again, the eastern door of the temple is opened only on five special occasions during the year. We prayed and then moved on to have dinner.

After dinner and a good night's sleep, we left at 5 am next morning for the "Suchindram" temple. The architecture of this temple is counted as one of the marvels of craftsmanship of the golden days of India. The principal deity of this temple is a Linga, carved out of a single stone, and represents Lord Shiva (The Destroyer), Lord Vishnu (The Preserver) & Lord Brahma (The Creator). It is the only one of its kind in India. Inside the temple there is a pavilion which has musical pillars, each carved out of a single stone. The temple corridor is so vast that one could easily get lost while trying to find the way out. Legends say that the temple got the name "Suchindra", when Lord Indra prayed to a Shiva Lingam over here which got him relieved from a curse. 'Suchi' simply means "Purify" and Indra refers to Lord Indra, the king of gods in Indian Mythology. There is also a huge statue of Lord Hanuman, carved out of a single granite block. In the court yard of the temple is a sacred lake with a pavilion in middle, which greets visitors before they visit the main temple tower.

Our next stop after breakfast was the Udayagiri Fort, an ancient fort of the Chola Dynasty which was re-built during 1729-1758 AD by King Marthanda Varma. The fort is situated 14 km from Nagercoil, on the Thiruvananthapuram-Nagercoil National highway, at Puliyoorkurichi. This fort was once an important military base for the rulers of Travancore, when Padmanabhapuram was their capital.

The next place of interest was the "Padmanabhapuram Palace", Martanda Varma's palace which is quite famous. The overall view of the palace was simply beautiful with its dignified architecture. Even on a hot and sunny day as that one, the interior of the palace was very cool and pleasant, due to the special flooring and wooden ceiling. The ceiling architecture was simply incredible. It was a well designed and well-constructed palace. There were various quarters starting from the King's and Queen's rooms, like their chambers, the Assembly Hall, the Painting Gallery etc. We saw a bed supposed to have been made using nearby 65 herbs, for the use of the Kings. There was an armour room where all the weapons are kept safely. It had no doors or windows (i.e., no ventilation). There was a watch tower from where any movement in and around the palace could be precisely noted, there were even staircases that led to secret hideouts! Even the drainage system had been well organized.

One section of the palace was a "Kalamandapam", a stage for cultural events to take place, during festive seasons. Two huge halls, one above the other, where everyday almost 3000 people per hall were fed for free was another wonder. There were huge Chinese jars to store pickles and huge grinders made of stones for grinding various substances for use in the Kitchen. Another interesting thing there was a chamber where the King would sit and watch chariot races taking place. Separate sectors were available for the foreigners who came to visit the king and the ceiling in this part was less beautiful i.e., was of the western architectural style. In short, for the age when it was built, the palace is a marvel, highly advanced and a very well-planned one with beautiful Indian architecture. After spending a few hours at the palace, we made small purchases of souvenirs at the small shops outside the palace.

Finally after having lunch that afternoon, we headed back to college. Although it was just a short trip for a day and a half, it was simply awesome and we got to learn as much as we got to enjoy! We thank the Samskriti Club of 'Amrita' for organizing such a wonderful trip!



The Saga Of Savitri

Suryasree B
S8 EEE

The epics and legends of India have numerous examples of exemplary women, whose virtue is admired even in the modern society. Savitri is one such gem of womanhood and wisdom. The story of Savitri and Satyavan was told by Markandeya to Yudhishira, when the latter asks if there has ever been a woman whose devotion to her husband matched that of Draupadi.

The story goes like this:

The king of Madra, Ashwapati was childless. He lived a life of an ascetic for many years, offering prayers to Goddess Savitri, deeply desiring for a son to continue his lineage. Pleased by his sincere prayers, Goddess Savitri appears before him and grants him a boon that he'll soon be blessed with a daughter of great energy. True to the boon, a baby girl was born to Ashwapati. She was named Savitri, as she was bestowed with delight by Goddess Savitri.

Savitri grew up to be a beautiful and virtuous woman. When she attained marriageable age, her father asked her to find a suitable husband for herself. Savitri set out on a pilgrimage and found Satyavan, son of a blind king named Dyumatsena, who lived in exile in a forest after having lost his kingdom and his eyesight. Meanwhile Narada, the wandering saint, informed Ashwapati and Savitri that though Satyavan possessed the best of qualities, he was destined to die one year from the date of their marriage. Hearing this shocking news, Ashwapati pleaded with Savitri to change her decision. In spite of repeated pleadings from her father Savitri stuck to her decision.

According to her wish, Savitri was married to Satyavan. She changed her clothing to that of a hermit and accompanied him to the forest. She lived in perfect devotion to her husband and parents-in-law and proved to be a devout wife and a dutiful daughter-in-law. Three days before the foretold death of Satyavan, Savitri takes a vow of fasting and vigil. On the morning of Satyavan's predicted death, Savitri asks Dyumatsena's permission to accompany her husband to the forest. He grants her wish. While Satyavan was splitting wood in the forest, he suddenly felt weak and became unconscious. Yama, the God of death, efulgent as the sun, head decked with a diadem and a noose in hand comes to claim the soul of Satyavan. Savitri did not give up. She followed Yama as he carried Satyavan's soul away. Yama tries to convince her and pleads with her to return.

The conversation that ensues is a wonderful treasure of wisdom.

Savitri: I have heard that emissaries are sent to take away the dead... but why have you come in person, Oh Lord?

Yama: This prince is a person endowed with great beauty and virtue and has many accomplishments. He deserves more than an emissary to take him away. So I have come personally.

With this, Yama pulled up the body of Satyavan. Savitri, ever devoted to her husband, follows Yama.

Yama: Why do you follow me? Go back and perform the funeral rites of your husband.

Savitri: I am vowed to be with my husband wherever he is or goes, forced or on his own accord. I will follow him. I would like to speak to you for sometime. Please listen to me. Those whose mind is not under control do not acquire merit by leading the four successive modes of life—*Brhacharya, Grahastashram, Vanaprastashram and Sanyasa*. Religious merit is said to consist of true knowledge. The wise have declared religious merit to be the foremost of all things and not the passage through four successive modes.

Yama: Oh respectable lady! I am impressed by your words of wisdom and your style of speech. Ask me any boon, except the life of Satyavan.

Savitri: My father-in-law leads a life of retirement in the forest, bereft of his kingdom and eyesight. Please restore his eyesight to him and let his eyes become as powerful as the sun.

Yama: May your wish be granted, but please desist from following me. You must be feeling weary by now.

Savitri: How can I feel weary in the presence of my husband? Oh lord of the celestials. Listen to me...

Even a single meeting with the pious is highly desirable; friendship with them is still more so. Interaction with the virtuous can never be fruitless. One should live in the company of the righteous.

Yama: Your speech delights the heart and enhances the wisdom of the learned. Ask another boon, other than Satyavan's life.

Savitri: My father-in-law is deprived of his kingdom. May the monarch regain his Kingdom. May he never renounce his duties.

Yama: The king shall soon regain his kingdom. He shall not discontinue his duties. I have granted your second boon also. Now desist. Don't take any more trouble in following your dead husband.

Savitri (continues): The eternal duty of the good towards all creatures is never to injure them in thought, word or deed but to love them and give them their due consideration. Men are destitute of both devotion and skill. The good, however show mercy to even their foes when they seek their protection.

Yama: Your words are like water to a thirsty soul, Oh reverent lady... ask for the third boon.

Savitri: My father is without sons. Grant him a hundred sons, so that his line is perpetuated.

Yama: May your father be blessed with a hundred illustrious sons ! Now please return. You have come a very long way.

Savitri: I am not conscious of the length I have travelled. You are the powerful son of Vivasvat. It is why you are called Vivasvata by the wise. Since you are impartial to all creatures, you have

been designated as the god of justice. It is the goodness of the heart alone that inspires the confidence of all creatures. It is for this purpose that people rely particularly on the righteous.

Yama: I have not heard this from anyone except you. I am highly pleased by your speech. Ask for the fourth boon and return.

Savitri: Oh Lord! May I and Satyavan have a hundred sons, possessed of strength and prowess and capable of perpetuating our race.

Yama: Your wish will be fulfilled!

Savitri: They who are righteous always practise eternal morality, and the communion of the pious with the pious are never fruitless. The pious do not pose any danger to the pious. It is the righteous who by their truth make the sun move in the heaven. It is the righteous who support the earth by their austerities. The righteous continue to help others without expecting anything in return. The righteous are the protectors of all and on them depend the past and the future.

Yama: The more you say such words that are so full of great significance, rich with wise phrases and agreeable to the mind, the more respect I feel for you. Ask for some incomparable boon!

Savitri: The boon you have already granted me is incapable of accomplishment without union with my husband. Therefore, among the other boons, I ask for this, May Satyavan be restored to life. Deprived of my husband I am as one dead. Without my husband, I do not wish for happiness, heaven or prosperity. Without Satyavan I cannot make up my mind to live.

Yama: So be it! He unties his noose and cheerfully says.

Oh auspicious and chaste lady, your husband is thus freed from me. He shall not only be free of all diseases, but shall attain a life of four hundred years and shall attain great fame in the world.

Yama having said this, departed for his abode.

Satyavan, woke up as if from a deep sleep, he still did not have any knowledge of what had happened. Satyavan and Savitri departed for home only to be delighted to see that Dyumatsena had regained his eyesight. Savitri narrated the story to Satyavan, his parents and the gathered ascetics. Very soon a large number of people thronged the hermitage and brought the news of Dyumatsena's usurper having being killed. They pleaded with Dyumatsena to resume his kingship. Joyfully the king and his entourage returned to their kingdom.

Savitri is the epitome of steadfast wifely devotion and faith. Her conversation with Yama is a treasure house of wisdom only a glimpse of which could be included here. In India, Tamil Brahmin girls and women commemorate Savitri's devotion by wearing a yellow thread with their chains or 'thalis' and observing a fast, on that 'fateful' day, every year. This custom is called 'Thali Noyambu'.

Trade and Commerce in Ancient India (till 300 AD)

Part 2

Balagovind N K Kartha

S6 ME

Weights and Measures

Historically, the use of weights and measures has been dated much earlier than the use of coins and money. Books like the “*Vasishtha Dharmasutra*” describe weights and measures as essential household articles. The standardisation of the weighing system was given due importance and falsification of weights and measures was recognized as a serious offence. During the Mauryan times, special officers named “*Pautavadhyaksha*” and “*Sansthadhyaksha*” were appointed in order to examine and calibrate the weights and measures, periodically, every 6 months. Kautilya’s Arthashastra has clearly mentioned the weights and measure system that he introduced during his tenure as the prime minister of the state. Weights were manufactured in state controlled factories and sold under fixed regulated prices. Material was chosen such that it did not expand or contract with climatic changes. The Indus weights were made of different kinds of stones of different shape and size. But this system lasted only during the reign of the Mauryas.

But, despite the precautions taken, there were still discrepancies in the weights due to various other factors and so in order to compensate for these discrepancies, grains in excess were added (in case of selling grains for example). In case of wine, flower, fruits etc., 1/4th of the measured quantity was given in excess. The loss incurred by the shopkeeper due to this difference was compensated by the state.

People developed a wide range of weights in order to weigh commodities varying from light and precious to very heavy items.

Archaeologists have excavated scales with suspended copper pans which suggest the widespread use of common balance as used today. Also engravings of balances are found on coins which also substantiate the use of a well-defined weighing system. People even used weights and balances for trading perfumes.

In Arthashastra, Kautilya explains a weighing system which was completely devised by him. According to his system, there were 10 varieties of light balances and 6 types of heavy balances with double pans.

Though we infer a lot from Arthashastra, it is to be noted that the details about heavy weights is too meagre. However for measuring liquids, specially calibrated measuring pots were available. For heavy weights, large wooden planks and logs of standardized weights were suspended as done today. In ancient India these balances were known as *Tula*. Although this word is not mentioned in the Vedas, it is mentioned in the “*Vajasaneyi Samhita*”. As time passed this became a part of the household as well.

As the weighing system got better and better, people also started to develop technologies to counterfeit them. Counterfeiting and forgery were considered social crimes and those who were found guilty were given rigorous punishments in ancient India. Methods were taken to avoid such malpractices and the king’s officials were commissioned to check shops every 3 to 6 months.

Business organisation

It is difficult to explain exactly the business organisation of the time. But certain inferences can be made from different Vedic texts and other ancient books. Corporate life had originated even in Vedic times. And there was also the system of shares and partnership.

As mentioned in the Vedic texts, the Vaisyas always outnumbered the Brahmanas and Kshatriyas. The Vaisyas were the wealth producers and were, therefore, exploited by the ruling class, the Kshatriyas, and the Brahmanas. The farmers, cattle breeders and artisans were taxed heavily and their living conditions went from bad to worse. The real wealthy vaisyas were the traders and merchants.

In order to safeguard themselves from exploitation, those with common business interests formed associations or guilds. There are evidences of this from Buddhist sources. Kautilya too had suggested and allocated places for people involved in various work. There were around 18 guilds across India. The guilds formed were managed by heads named *pramukha*, *jetthaka* or *setthi*. These people were heads of more than one guild too. These people might have been elected based on their financial status, superiority and political influence. The responsibilities of these heads, i.e. *setthis* were not confined to commerce and finance only but they also had some social and moral responsibilities. Their fame spread far and wide. They had respectable positions in the king’s council and were highly respected by the king and citizens.

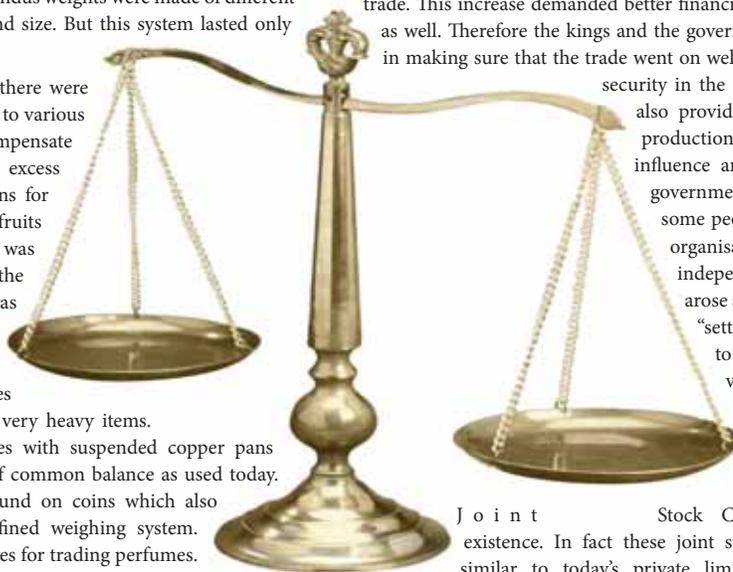
By the 6th century BCE, there was a tremendous increase in the volume of trade. This increase demanded better financial planning and setup as well. Therefore the kings and the government took initiatives in making sure that the trade went on well. They ensured better

security in the trade routes and they also provided capital to help in production. But due to over influence and indulgence of the government in their activities, some people started their own organisations which were independent. And then arose a class of people called “*setthis*” who were ready to finance such new ventures. These people not only financed but were also active partners of the company. Thus the

Joint Stock Company came into existence. In fact these joint stock companies were similar to today’s private limited companies. The owners of the company in return gave a share of their profit to the shareholders. The practise of share trading, money lending, and partnerships were very popular. Partnerships were of two types, secular and non-secular partnerships. In secular partnerships, the profit was shared among the stake holders and these stake holders enjoyed equal legal status within the company. Non secular partnerships were generally religious partnerships. For such partnerships, the *dakshina* or fees that they got was divided. Also there were contracts between the partners and owners. Partnerships existed in all kinds of trade from the pot making business to the imports and export business.

Apart from this there were partnership rules which were laid by the law givers of the time. The laws were not so stringent but were humane and provided security to the consumers, producers and partners. A mutually healthy understanding relationship was established on the basis of laws before entering into the partnership.

More details are available in Arthashastra, where details about the laws are also given. It is interesting to know that the present system of business administration also existed before 300 AD in India. Evidence shows that these businesses were very well ordered, planned and were effective. Arthashastra is now a Bible for most technocrats and business magnets across the globe. Though the whole of Arthashastra is not available, parts of it are available and preserved. Different authors of 19th, 20th and 21st centuries have written in great admiration about Kautilya and his works and Kautilya’s writings are in great demand now.



The Legendary Dorasamudra

Jayashree S6 EEE

Halibedu or Haleebedu was once a thriving capital of the great Hoysala Empire. This ancient city was founded in the 9th century and was more popular by the name Dorasamudra with reference to the huge lake sized tank built for the purpose of irrigation. Halibedu belongs to the present day Hassan district in Karnataka. The word Halibedu is synonymous to old encampment or ruined city. In the venture of knowing more about this historical place it is relevant to know more about the emperors and the empire.

The prosperous Hoysala empire once extended from river Kaveri in the west to river Krishna in the east, which encompasses most of the modern Karnataka and parts of Tamilnadu, blessed with many fertile deltas. Hoysala means 'strike Sala'. The legend says that the head of this dynasty, Sala, fought with a tiger and saved his subject's life. This empire gained prominence under the rule of Vishnuvardhana, who was basically a Jain and later adopted Hinduism. He defeated the western Chalukyas and with the decline of Chola power, expelled them from Karnataka. His vision of a completely independent kingdom was cherished by his grandson Veera Ballala II who freed the Hoysalas from subordination. This flourishing kingdom was conquered by Malik Kafur, the commander-in-chief of Alla-ud-din Khilji, the sultan of Delhi in the early 14th century. He sacked Halibedu and destroyed the great city mercilessly taking away loads of jewelries, gold and silver. It was again attacked and ravaged by the forces of Mohammed Bin Tughlaq in 1326. After the repeated attacks the city



was never reoccupied again and no other emperor gave the city its prior importance.

Later Haleebedu, Belur and all the surrounding areas came under the rule of Harihara who later established the Vijayanagara empire. Halibedu is a memoir of wild destruction and ignorance of art and architecture.

Even though many temples were constructed, the most famous is the Hoysaleswara temple dedicated to lord Shiva. This is indeed a sculptural extravaganza

worshipped by almost all the critics and experts around the world. It is interesting to know that one of the first explorations done in Haleebedu was by Colin Mackenzie, the first surveyor general of India with his Indian as well as European staff. It will be worthy to note the comments given by James Fergusson, an art and architecture expert that "the temple may probably be considered as one of the most marvelous exhibitions of human labour to be found even in the patient east." He mentions that the all the wild and warmth of human faith is portrayed there. An excellent and apt comment for the historic structure! We will feel like all the creativity and imaginations has culminated to a single point. An excellent example to be mentioned is the 3D structured skulls of Dwarapalakas! It was known that it took almost three generations to complete the construction which remains now. The present day structure is not complete in its form because of the invasion. Even after suffering the

brutal invasion it will be hard for us to believe that all these remains because, all that we are used to are buildings collapsing when an earth tremor occur. The major specialty of the temple is that it was constructed as different layers and assembled in order. Hence it can be restored! It was learnt from ASI (Archeological Survey of India) that no one in the present knows these restoration techniques making it impossible to renovate or follow those methods. Their way of construction was highly complex and unique; just as Fergusson said, so wild! It can be noted that all the

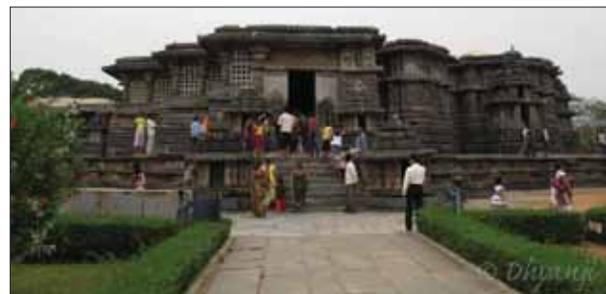


Hoysala structures are star in shape most of them are monolith works. In Hoysaleswara temple importance is given to Shiva as most of the people were shivaites.

The breathtaking sculptures in Hoysaleswara temple includes the statues of Madanikas, Ravana shifting the Kailasa mountain, the Gajendramoksha, the shooting of Mastya yantra, lord Shiva as the dancing Nataraja, and many more. The lower portion of the temple is adorned with picturesque sculptured friezes which continuously run along the wall. We can also see some of the finest wall panels like the durbar of Lord Shiva, pranks of little Krishna, Krishna lifting the Godavari mountain and many more. The Hindu mythology as a whole can be inferred from these scriptures.

Halibedu is indeed a treasure house of Indian architecture. Although most visitors focus their visit on Hoysaleswara temple, the site has many other temples to see too like, the three surviving Jain temples or Bastis, Kedareshwara temple, Virabhadra temple and the like. It is a fact that the intricate sculptures of Hoysala period have always attracted admiration, both as components of a larger structure and as works of art in their own right.

Reference: Haleebedu - A guide to the sight and the museum. by Archeological Survey of India



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