Traditional Knowledge Systems in India and their Relevance

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Abstract

Among the great civilisations of the world – the Greek, Roman, Mesopotamian, Mayan, Chinese, Egyptian civilisations that date back to about 8000 years ago, the Indus Valley Civilisation or as it is popularly called, the Indian civilisation is one of the richest and most ancient ones. Whereas several of these ancient civilisations have died or become enfeebled like the Egyptian and Roman civilisations, the Indian civilisation and culture along with the Chinese one, has remained alive and vibrant till date. There have been periods when our culture and civilisation have been overshadowed by foreign invasions especially during the British period when a concerted effort had been made to subdue, sideline and supplant Indian culture, politics, knowledge systems and our polity and economy.

The Indus Valley Civilisation is at least as old as 3,300 BC covered an area of more than one million square km that spread from present-day Afghanistan, Baluchistan, Pakistan and North West India to the upper reaches of the Ganges-Yamuna Rivers. Archaeological and textual records have been discovered with written records available from the Vedic period when the Vedic texts were composed in India in Sanskrit from about 1,500 BC.

Our culture and indigenous knowledge systems include education (at school and higher levels), agriculture, astronomy, architecture, Ayurveda, linguistics, philosophy etc. to name some principal areas of human activity and endeavour. Questions of healthy food and water management were also important. In this article I wish to talk about some aspects of our old heritage of learning and scholarship

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and discuss how some of the areas that were sidelined and began to languish as a result of British policies and beliefs are again beginning to show some revival. A concerted effort is being made to encourage and support the efforts of restoring and revitalising those areas that faced difficult and stormy conditions during the British period. Some aspects of our ancient culture like music and dance are of course not only surviving but also thriving.

Let us focus on the following areas:

- education system
- astronomy
- ayurveda and surgery
- indigenous architecture
- polluted Food
- water management

Education System

India had a rich and widespread system of education in ancient times. It might be called *religious* education (in modern terminology). Several well known books on the subject are available. Of these the books by A S Altekar (1944), R K Mookerjee (1951) and Dharampal (1983) are well known. The first two authors provide detailed knowledge about the type of education available in ancient India, the contents of this education, the nature of teachers and pupils and how this education system was conducted. Much of this information is available in Sanskrit language, although now some books have been translated into English and other languages. Mookerjee writes that in the ancient tradition, "the total configuration of ideals, practices and conduct is called *Dharma* (religion, virtue or duty) and that it is religion that gave its laws to social life and organisation of ancient Hindus". He adds "Nowhere is this distinctive tendency of Hindu thought more manifest than in the sphere of learning and education... Learning was prized and pursued not for its own sake, but for the sake of and part of religion."

It is for this reason that the study of the Vedas was of prime importance. There were several scholars who expounded on the philosophies contained in the *Veda*s, the *Purana*s and other epics. Mookerjee refers to Panini the world's first linguist and grammarian and his followers Patanjali and Katyayama who also expounded on the *Veda*s.

Another well-known commentator Manu writes that education was for all although Brahmin pupils were preferred. Some women also received education. There were women *rishi*s called *Brahma-Vadinis* who were eligible for Vedic study and *upayana* (Vedic initiation for girls). Apart from the majority of Brahmin teachers, there were some non-Brahmin

teachers also when their need arose. Teachers were mainly of two categories – *Acharya* and *Upadhyaya*. Pupils would live and study in the house of an *Acharya* without payment of fees, but under the *Upadhyaya* system, pupils had to pay some fees. It is also to be mentioned that teaching was mainly done orally. Even when a written alphabet was developed in the Vedic period, the oral method was preferred.

In his well-known book *Education in Ancient India* A S Altekar writes that girls' education was quite common in the Vedic age. Women were allowed to study Vedic literature and perform various sacrifices up to about 200 BC. He writes that some of the compositions of *Rigveda* were made by women poets. A Vedic initiation for girls termed as *upanayana* was also common. This practice came to an end at the beginning of the Christian era. According to Altekar Buddhism also helped in spreading education among women of Buddhist families.

Dharampal's book *The Beautiful Tree* (1983) has provided several reports of the system of education prevailing in Madras Presidency, Bengal, Bihar and Punjab during different periods from the late 17th century to the middle of the 19th century. He gives information about the number of schools, the number of students (both boys and girls), and the years of schooling etc. and contrasts these numbers with what was prevailing in England during the corresponding periods. In many cases the contrast is favourable to India. He also gives brief information about the education at college level. He finds that generally higher education was the domain of Brahmin boys who after some years of study at the elementary level went to *Vedums* and *Sastrums*; the former term implied the study of the *Veda*s the mother of all sciences. The latter term included study of all sciences – astronomy, law, theology in Sanskrit language. The teachers were mostly Brahmins. Both the teachers and the poor boys were supported by some kind of endowments or charity from zamindars or rich people of the community.

An M.Phil. dissertation by Akha Kaihirii Mao (2009) studies the traditional education system of the Nagas in Manipur in NE India where the *Mao* sub-tribe is the dominant group. The young scholar who himself belongs to the Mao community describes that this traditional education was imparted to both boys and girls who lived in separate dormitories (*Krochi* for male and *Elochii* for female in their language). The study attempts to explain how despite the fact that there was no formal written language among the Maos, this traditional *Morung* system was able to provide

a basic holistic education orally. Many skills and cultural values (folk tales and traditions) were also taught to these young students. Their religious faith that largely comprised worship of nature was also transmitted through this dormitory system.

Akha informs that this system was largely in vogue even as late as 1960 in some parts of Manipur. It was prevalent before and after the arrival of the British. Gradually, like all traditional systems of education, this system was discouraged as being primitive and non-scientific that needed to be changed to the modern western system of education.

Any system of education has the following components: the content, the organisation and the delivery system. While Dharampal's book gives information about the organisation and delivery systems of elementary and higher education in parts of India, it is almost silent on the contents of the system especially at the higher level. This is not surprising because the reports on which the book is based are silent about the content. The officers would not be competent to write about this feature in their reports both because of the ignorance of the Sanskrit language as well as the subject areas that were being taught at these institutions.

The aspect that I wish to stress is that while some parts of India may have been better in terms of numbers in comparison to what prevailed in England, our content was not suitable in the areas of science and technology. Restricting ourselves to only science and mathematics, while the content followed in England and Europe led to tremendous advances in these fields, our system did not produce any scholarship of significance in these areas.

Names like Galileo, Copernicus, Isaac Newton, Joseph Priestley (chemistry), Daniel Bernoulli (Swiss physicist and mathematician), Joseph Lagrange (French mathematician and physicist) James Watt (Scottish inventor), Charles Darwin and Humphrey Davy (safety lamp) and countless others have developed science and mathematics and produced inventions of various types that have led to advancement of mankind and technology. It is hard to find a comparable name from India during this period.

There were some scholars who were working in areas of *Ayurveda*, linguistics and astronomy but these names are few and their contribution to science in general is limited. In linguistics the names of Panini and Patanjali and the former's work *Asthadhyayi* dating to about the 5th century BC is well known.

Astronomy

Astronomy was another area in which our ancient scholars were adept. A systematic account of

astronomy in India begins with the *Sidhhantas* – the *Paitamaha Siddhanta* and *Surya Siddhanta*. It is known through various texts such as Vedic texts, Jain literature and books of renowned mathematicians like *Aryabhata* (b.476 AD), *Brahmagupta* (b.598) and *Bhaskara* (b.629 AD) that India had a rich and vibrant heritage of studying astronomical events. These texts were based on the knowledge that it was the sun that was stationary with planets, including the earth revolving around it. This knowledge was available much before western scholars who believed till the time of Copernicus and Galileo that it was the earth that was stationary.

Dharampal in *Indian Science and Technology in the 18th Century* (2000) writes that a British officer Sir Robert Barker visited Benares in 1772 and saw that there was an astronomical observatory which was known as the *Man Mandir* near the *Dasasvamedha Ghat*. The observatory whose date is not fully known is the oldest one in India and one of the oldest in the world. Unfortunately it remains in a dilapidated condition today.

The study of astronomical events involved the motion of the planets and some well known stars and was used in predicting the occurrence of lunar and solar eclipses as well as explanation of the phases of the moon. Sawaai Jai Singh was instrumental in building observatories like the *Jantar Mantar* in Delhi, Jaipur and Ujjain to understand astronomical events and to predict lunar and solar eclipses. This was based on detailed and painstaking observations of astronomical events spread over long durations of time and a sound knowledge of the structure of the planetary system around the Sun.

Ayurveda and Surgery

Ayurveda literally means the science of life. It is believed that Indian scholars like Atreya and Agnivesa knew the basic principles of *Ayurveda* as early as about 800 BC. On the basis of this knowledge Charaka and Sushruta respectively compiled the books *Charaka-Samhita* and the *Sushruta-Samhita* which are among the oldest known treatises on *Ayurveda*–the former dealt mainly with physiology and medicine and the latter with surgical operations.

Sushruta who lived about 2600 years ago wrote a book called *Sushruta-Samhita* which describes more than 120 surgical instruments and 300 surgical procedures that demonstrate how surgery was practised at that time. Plastic surgery as it is called today, was also practised by Sushruta and continued to be in vogue even during Hyder Ali's times in the 1770s. Sushruta is often referred to as the

'Father of Surgery' for his immeasurable contributions. Surgical operations during Susruta's time were performed using opium, wine, Indian hemp and of course by tying up the patient. During the Muslim period alcohol was also used for this purpose.

Even as late as about a half century back, *Ayurveda* was looked down upon as being not 'scientific' and rigorous; it was thought to be based on only pragmatic experience that was beneficial only in certain uncomplicated cases of illness. It was considered a 'hit and miss' type of cure unlike the western allopathic system of medicine that was based on rigorous experimental trial based methodology. Today however this attitude has largely changed, and there is revival of *Ayurveda*. Its benefits are well recognised and there are medical institutes both at under–and post–graduate levels offering degrees in Ayurvedic medicine. Research is also going on in the properties of traditional plants and herbs.

Ayurveda treats the disease in a holistic manner and is dependent on knowledge of trees, herbs and plants which have medicinal values. A few books like *Useful Plants of India* published by CSIR, New Delhi in 1986 and a book edited by A K Kalla and P C Joshi (2004) have given very useful knowledge of the properties of these plants and herbs and how they are being used for curing various diseases like diabetes etc. In the latter book (pp. 351-361) Dolly Murmu has written an article "Plant use among the tribals of Jharkhand" describing the many plants, trees and herbs that have medicinal and curative properties. She provides their local and botanical names and gives the methods of preparation of medicines from these plants. She however cautions that 'plant remedies are harmless provided they are selected carefully and taken under medical guidance'.

Efforts by the Yoga Guru Ramdev and his associate Balkishan are already on to study and classify various plants in northern parts of India for prevention of diseases and their cures. They have written an interesting book *Ayurveda–jadi booti rahasya* (in Hindi) which was published by *Divya Prakashan,* Hardwar in 2008. The book is profusely illustrated and gives the properties of several herbs and plants along with their local and botanical names. Beneficial properties of some of the common trees like *neem* (margosa) and plants like *tulsi* (basil) and *haldi* (turmeric) are well known. Efforts at patenting some of the extracts from these plants were rejected in western countries as it was successfully proved by Indian experts that these plants were age-old and their properties were also well known and documented in

various places in India since times immemorial. Other plants like 'gilohe' (*tinospore species*) have properties of curing diseases like diabetes etc.

It is interesting to refer to the well known Kerala Ayurvedic physician Itty Achudan Vaidyam who lived in the Malabar area in the second half of the 17th century. Based on Itty's knowledge of traditional forms of Ayurvedic curing and the several palm leaf manuscripts that he had written, the Dutch governor of the region *Hendrik van Rheede* compiled a book called *Hortus Malabaricus* in Latin. This compilation which comprises 12 volumes with sketches and copper plate engravings took a long time – about thirty years and was published from Amsterdam between 1678 to 1693. It has been subsequently translated into English and Malayalam languages by Dr K S Manilal.

Indigenous architecture

We are confronted with huge monoliths of buildings – all steel and glass that shine invitingly on a clear day. This is the sign of urbanisation. The more the urbanisation, the taller and grander are these buildings. But what happens when you step inside? These buildings will consume megawatts of electricity whether in summer or winter and are difficult to maintain. Contrast this with the style of buildings whether individual homes or palaces or temples etc. Earlier these buildings in India used natural sources of light and sunshine for cooling in summer as well as for heating in winter. In northern India both summers and winters are harsh as a result of which it was imperative to make buildings that could bear the brunt of the weather. This was done by what Vinod Gupta in 'Indigenous Architecture and Natural Cooling' (private communication) calls natural cooling which required shading of building surfaces from sunlight, selective ventilation etc. and 'space use'. The latter term required users to 'organise daily activities in space and time so that not all spaces had to be maintained at equal levels of comfort…'

These techniques are well known even today but architects trained in western concepts of building huge structures of cement and steel are not keen to make use of these. Of course there are constraints – shortage of land in urban areas as a result of which one has to construct multistoried structures. But even here indigenous methods of allowing light and sunshine or preventing of sunshine in hot months could be utilised by suitable modification.

Another related feature of Indian architecture is *Vaastu Shastra* which basically is a traditional form of designing buildings that takes into account the surroundings, geographical locations and similar

features. It is also related to certain superstitions which dictate the design as well as the methods and timings of starting the building work.

The type of houses or buildings is also naturally dictated by what materials are available locally and also whether it is located in a village or urban area. A *kachcha* building is made of materials like grass, mud, bamboo and rarely uses bricks or cement etc. These houses are easy to make and easy to move if required and are also economical.

Although these *kachcha* houses are easy to build they require certain skills and techniques that are part of our heritage. India is well known for continuity in indigenous craft design and passing on of skills from generation to generation. But this does not mean that there is no change or that these skills are static; these traditions and skills keep on evolving depending on local culture, needs and the environment and result from a healthy dynamism found in the artisans. Some of the homes or dwellings especially made by certain tribals like the Gonds are not only comfortable to live in but are also beautiful and artistic. Efforts must be made to keep these traditions and skills alive.

Polluted Food

Both water and food that we consume are quite often polluted. While the reasons for water pollution are generally seepage of harmful chemicals from factories and throwing of garbage and sewage in rivers and lakes, food has become unsafe because of pesticides and chemical fertilisers that are increasingly being used in agriculture. Earlier, farming was generally organic in nature that made use of natural fertilisers like cow dung and bio-degradable materials; today the emphasis is on chemical fertilisers and pesticides for prevention of crop disease. This use is increasing from day to day and pesticide residues make food unsafe for humans and cattle and also result in frequent crop failures. We do not wish to detail here the problems arising out of chemical based agriculture but a large number of farmers' suicides are a tragic reminder of how things have gone wrong and what needs to be done to alleviate this problem.

In a recent TV show, anchored by the well known Hindi film actor Amir Khan (24 June, 2012) and his article in *The Hindu* newspaper (25 June, 2012) the focus was on pesticides which were introduced to increase crop yields especially after the Green Revolution in the 1960s. However, these made the food that we ate poisonous and unsafe. Spraying pesticides also exposes the farmers to their harmful effects because of their proximity and contact. *The Hindu* article also talked about the benefits of organic farming especially

in the state of Andhra Pradesh and how this was helping the farmers economically as well as in producing pesticide-free food. The Chief Minister of Sikkim also said on the show that his state has gone fully organic in agriculture by avoiding use of pesticides or chemical fertilisers.

The trick is to understand and apply traditional methods of farming including growing not just one crop like wheat or rice but growing a cocktail of crops in close proximity. The latter practice allows natural pest resistant and nitrogen fixation techniques that avoid the use of chemical fertilisers and pesticides that are both expensive and harmful.

Water Management

Dwindling sources of water for human and animal consumption as well as for agriculture has become a major concern all over the country. States like Rajasthan and Gujarat in Western India are particularly prone to this problem. The problem is becoming serious and may lead to a catastrophic situation if remedial measures are not taken. It is easy to ascribe the scarcity to increase in population, climatic changes and resultant irregularity of rains. Although, some irregular patterns of rainfall have been observed lately, the major factor cannot be ascribed to this phenomenon alone.

Traditional methods of water conservation (*harvesting* is a modern term) were sufficient and flexible to meet unusual conditions of drought. They were followed by all. People were aware of the constraints in the availability of water both for domestic use and for agriculture and faithfully remained confined within these constraints. Proof of these practices can be seen easily and have also been well documented by several authors. They are recommending the adoption of these practices to face the contemporary situation that has arisen in the development paradigms being followed and the insensitivity of modern man to this issue.

Fortunately, some enlightened NGOs and concerned citizens have woken up to this challenge and have been able to not only highlight the impending catastrophe of water shortage, but have taken some positive steps to avert this. The efforts of Rajendra Singh and his organisation *Tarun Bharat Sangh* to revive the sub-soil water in some parts of Rajasthan like Alwar are well known. He has succeeded by studying the traditional indigenous methods of water conservation and replenishment of water bodies like wells, *baolis,* lakes etc. Through this study and by adapting appropriate procedures, the organisation has largely succeeded in the objective of reviving agriculture and animal husbandry which has helped people who were forced to migrate, to return to their villages since water was

available again for their daily needs.

Another study of the arid and semi-arid regions of Rajasthan has been made by Mayank Kumar (2009) in his paper on "Flexibility and adaptability… of water management". He has highlighted the different methods of water harvesting that were earlier being practised in these regions which were subject to erratic and insufficient rainfall. He has examined the traditional agricultural practices being followed in these regions in the pre-colonial times. His paper also considers the interface between community and the state for suitable methods of water management. He also suggests some insights relevant for contemporary situations.

Anupam Mishra of Gandhi Peace Foundation, Delhi, who has devoted the last few decades to the problems of scarcity and harvesting of water, has also referred (private communication) to traditional methods of conserving and replenishing water bodies and has strongly recommended certain measures to address the problems of water scarcity that is affecting human, animal, plant lives and agriculture.

Mishra has eloquently talked on several occasions in the media and through his well known book *Taalaab* (in Hindi) about the disappearance of water bodies like lakes, *baolis*, wells etc. in many parts of the country including Delhi. He has also talked about the *Thar* area in Rajasthan which is almost a desert with very scanty rainfall – only about 16 cm in a year. Although this region is undeveloped in terms of infrastructure, it has been able to provide safe drinking water to almost all villages in this region. How? By community efforts and by conserving each drop of water; by not allowing bottling plants like Coke or Pepsi to divert water from the local villages.

Thus we notice that our own indigenous knowledge systems of water management are not only relevant, but also essential to alleviate the problem which could otherwise grow in unmanageable proportions and have serious implications for life.

Conclusion

The foregoing sections highlight the highest standards our civilisation achieved in various fields. But after so many centuries of this intellectual and material development and evolution, we reached a plateau and then began to decay and decline in many of these areas. It is easy to explain that this was due to European, especially British imperialism. The latter resulted in not only the British becoming our masters politically, but also adversely affected our thinking, psychology and existence and approach to life and inevitably led to a decline in our attainments in diverse areas of

learning and scholarship. This would be an easy excuse for our withering away. However even if it is largely true that with the advent of British imperialism our civilisation took a downward turn, we have to rebuild and reboot ourselves and try to acquire the strength and self confidence to develop and reach the pinnacle that we had reached in earlier eras.

To decry colonialism for all our faults would not only be misleading, it would also hamper our efforts at restoration of our civilisation. We must analyse our principal shortcomings – why we stooped so low and why we allowed our knowledge and skills to wither away. We must also accept that the western education and imperialism despite all its drawbacks also had a positive side. It brought us several benefits like modern science and technology; it brought railways, telephones, electricity, post offices and countless other benefits and society received a welcome boost. The introduction of these elements brought the various parts and regions of our country closer; the Indian nation that we are today was brought about mainly by British colonialism. The various principalities and minor and major kingdoms that largely lived apart without much interaction have come together due to not only the British but also efforts of sagacious men like Mahatma Gandhi, Jawaharlal Nehru and Sardar Patel. Earlier a person would not usually travel more than a hundred miles in any direction from where he lived. Except for *rishi*s and *dharamacharya*s and some other holy men who travelled all over the country and reinforced the concept of Hindu religion, people hardly travelled beyond a limited distance. That explains why we had so many kingdoms and *rajah*s and *nawab*s and so many languages and customs. Religion has united large parts of the country although the rituals and deities differ even today.

We have today a united army, a robust bureaucracy, widespread infrastructure and link languages in the form of English and Hindi that have brought us together and given us the concept of nationhood and a country.

We cannot forget the period of subservience and overlordship under the British rule. We however, can pick up the best they provided us in terms of modern science and technology, extensive infrastructure and a spirit of nationhood. But we must go beyond these 'gifts' that they provided. We must identify our own special character or *swabhav* and build on it. There were many ills in our society that great men like Gandhi, Tilak, Tagore, Vivekananda, Ambedkar and Nehru among others pointed out – our caste system and social prejudices etc. and victimisation of the poor and the

marginalised. These faults or ills were pointed out by people who were educated in the modern sense either in England or through the western system of education. Thus the western education system had the ability to identify and comprehend the ills and faultlines in our social and economic systems. Now that these and other similar faultlines are known to us – discrimination, poverty, lack of basic necessities etc. and now that ours is a mature democratic nation that believes in justice and rule of law, we must delve deep into our social ethos, liberal religious base and a deep rooted Indianness to find the solutions to our problems.

The study of our ancient indigenous knowledge systems can help and guide us in this lofty endeavour.

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