

**Silver Jubilee Year**  
*Seminar on*  
**Innovations and Inventions**  
**in**  
**Ancient and Medieval India**

Saturday, 29th December 2007

**ABSTRACTS OF PAPERS**

I am extremely happy to present the book of abstracts for the seminar “Innovations and Inventions in Ancient and Medieval India”. Institute for Oriental Study, Thane has been conducting seminars since 1982. Various scholars from India and abroad have contributed to the seminars. Thus we have a rich collection of research papers in the institute. Indian philosophy and religion has always been a topic of interest to the west since opening of Sanskrit literature to the west from late 18th century. Eminent personalities both in Europe and American continent have further contributed to this literature from the point of view they perceived our philosophy and religion. The topic of this seminar is important from that point of view and almost all the participants have contributed something new to the dialogue. I am extremely thankful to all of them.

V. V. Bedekar

Dr. Vijay V. Bedekar  
President  
Institute for Oriental Studies, Thane

## About Institute

Sir/Madam,

I am extremely happy to inform you that the Institute for Oriental Study, Thane, founded in 1984 has entered into the 24<sup>th</sup> year of its existence.

The Institute is a voluntary organization working for the promotion of Indian culture and Sanskrit language. The Institute is registered under the Societies Registration Act, 1860 (No.MAH/1124/Thane dated 31<sup>st</sup> Dec.,1983) and also under the Bombay Public Trusts Act 1950 (No.F/1034/Thane dated 14<sup>th</sup> March, 1984). Donations to the Institute are exempt under 80 G of the Income Tax Act, 1961.

To achieve the objective of the Institute, we have been conducting tutorials, discussions, exhibitions, film and slide shows. We have organized various seminars on different topics related to Indian culture. We have also conducted study tours to different places of historical and cultural importance both in India and abroad.

I am giving below a list of activities conducted by the Institute since its inception in 1984. This will give you an idea of the sphere of activities covered by the Institute.

### (A) SEMINARS

The Institute has so far conducted 17 Seminars on different topics as under:

1. Science & Technology in Hindu Tradition (1982)
2. Music and Musical Instruments in Hindu Tradition (1982)
3. Dance & Drama in Hindu Tradition (1983)
4. Sanskrit Outside India (1983)
5. Paninian Grammar(1984)
6. Minor Sciences (from ancient Sanskrit literature) (1984)
7. Hindu Mythology and its Inter-relationship with the Mythologies of the World (1984)
8. Museology (1985)
9. Tantra (1985)
10. Smritis (1986)
11. Administration in Ancient India (1987)
12. Varnashrama Institute in Ancient India (1988)
13. The Puranas (1989)
14. Ecology and Ancient India (1990)
15. Greater India Outside India (1991)
16. Agriculture in Ancient India (1992)
17. Kama as a Human Goal in Ancient India (1993)

18. Vedangas (23<sup>rd</sup> April, 1994)
19. Education in Ancient India (29<sup>th</sup> April, 1995)
20. Law & Justice in Ancient India (27<sup>th</sup> April, 1996)
21. Sports and Pastimes in Ancient India (26<sup>th</sup> April, 1996)
22. Science and Technology in Ancient India (25<sup>th</sup> & 26<sup>th</sup> April, 1998)
23. Second International Conference on Marine Archaeology (8<sup>th</sup>, 9<sup>th</sup> & 10<sup>th</sup> January 1999)
24. Sthapatya in Ancient India (25<sup>th</sup> December, 1999)
25. Bio - Revolution and Hinduism (23<sup>rd</sup> December 2000)
26. Dietetics in Ancient India (29<sup>th</sup> December, 2001)
27. Kalas and Vidyas in Indian Tradition ( 28<sup>th</sup> December, 2002)
28. Panini, Bharata, Kautilya, Vatsyayana and Indian Civilisation (27<sup>th</sup> December 2003)
29. Dialogues in Indian Tradition (25<sup>th</sup> December 2004)
30. Indian Contribution to World Civilisation (25<sup>th</sup> December 2005)
31. Darshana and its relevance to Indian culture (30<sup>th</sup> December 2006)
32. Innovations and Inventions in Ancient and Medieval India (29<sup>th</sup> December 2007)

#### **(B) STUDY TOURS**

The idea behind undertaking such study tours is to acquaint the members with the culture, the old monuments, museums, libraries, etc., and give them a first-hand knowledge to assess their cultural and architectural values.

(i) So far, the Institute has conducted the following study tours within India:

1. Tamil Nadu (1985)
2. Kutch & Gujarat (1986)
3. Paithan, Ter and Nasik (Maharashtra) (1987)
4. Karnatak (1988)
5. Kerala (1989)
6. Andhra Pradesh (1990)
7. Orissa (1991)
8. Rajasthan (1992)
9. Madhya Pradesh (partly covered) (1993)

(ii) The Institute also led teams of scholars to foreign lands to attend Conferences and visit libraries, museums, old monuments, etc.

1. Philadelphia (U.S.A.) to attend and participate in the VI World Sanskrit Conference (1984)
2. Beijing & other places in China. Our team was the first non-political and non-governmental unit to visit mainland China after the recent Revolution (1986)

3. Leiden (Holland) to attend and participate in the VII World Sanskrit Conference (1987). (The team consisted of about 25 scholars).
4. Members of the Institute participated in the History Conference of Asian Countries, held in Singapore in 1988.
5. In 1988, Dr. Vijay Bedekar, President of the Institute, visited Mohenjo Dado, Harappa, Taxila, Lahore, Karachi, etc. in Pakistan for a study tour.
6. Vienna (Austria) to attend and participate in the VIII World Sanskrit Conference (1990)
7. In 1994 – Melbourne Australia to attend and participate in the IX World Sanskrit Conference.
8. Turino, Italy – XI World Sanskrit Conference attended and participated in (2000)
9. In 2002 visit to Afganistan – observe aftermath of U.S. Intervention in Afganistan
10. XII World Sanskrit Conference at Helsinki, Finland in 2003
11. XIII World Sanskrit Conference at Edinburgh, Scotland, U.K.

### **( C ) EXHIBITIONS**

The Institute arranges exhibitions for the benefit of its members and the general public. The Institute has conducted the following four exhibitios:

1. An exhibition depicting the past history of Thane City of Two thousand years. (1985)
2. An exhibition of Encyclopedias in Marathi. The Institute also arranged loans to individuals through a co-operative bank, to enable them to purchase encyclopedia sets. The loan amount of Rs.15,000/- per person was taken advantage of by many people, and about 200 Encyclopedia sets were sold (1986).
3. Arranged an exhibition of Ecology, in association with the Prince of Wales Museum, Mumbai (1990)
4. The Institute arranged an exhibition of photographs taken by members of the Institute, and the coins collected during the different study tours (1992).
5. In 1994 - Institute arranged an exhibition of Encyclopedias and books.
6. In 1999 – Exhibition of books on Education
7. In 2000 – Exhibition of Manuscripts
8. In 2001 –Exhibition of Grammar Books
9. 2005 – Exhibition of Manuscripts donated by Dr. R.C. Dhere, Pune
10. 2006 – Exhibition of books and Manuscripts.

The Exhibitions were well attended and people from Thane, Mumbai, Pune and nearby places visited the exhibitions and expressed their satisfaction.

#### **(D) OTHER ACTIVITIES**

1. The Institute arranged a meeting of about 50 scholars of Western Region of India, to aid and contribute in the compilation of Encyclopedia of Hinduism being brought out under the editorship of Prof. Sheshagiri Rao (1988) a project of Hindu Heritage Research Foundation (Sanatana Dharma Sanskrit Shodha Pratishthan) Rishikesh.
2. The Institute conducted a course to acquaint students of Nagaland and Manipur with Bharatiya Culture (1989). The course was of six weeks' duration at Yeurl ( a suburb of thane) in which 15 students participated.
3. Arranged a lecture series of Babasaheb Purandare, 'on Shivaji and nation building' (1989)
4. Conducted a Yoga-Ayurved course of one year's duration (1990)
5. Arranged a film-show of one week's duration titled 'Parampara', in collaboration with the Films Division, Government of India, Mumbai. The films selected were based on Indian traditions. About 20 films of different durations – ranging from 10 minutes to 90 minutes, were screened (1991).
6. Second Brihanmaharashtra Prachhyavidya Parishad was organized in the year 1997
7. 2004 – Publication of Platinum Jubilee Felicitation volume to honour Dr. M.D. Paradkar, a renowned Sanskritist from Mumbai, and our patron.
8. Institute was recognised as Manuscript Resource Center (MRC) in the year 2005 by National Mission for Manuscripts, New Delhi.
9. 2006 – Celebration of 81<sup>st</sup> Birthday of Dr. M.D. Paradkar
10. 2006 – Dr. Vijay Bedekar, President of our Institute was awarded 'FELLOWSHIP' by Royal Asiatic Society London. He was honored by our Institute.
11. 2007 – Numismatics Expert from Thane, Shri Shashikant Dhopate received Late Dr. Parmeshwarilal Gupta award. He was felicitated by the Institute.

#### **(E) TEACHERS' EXCHANGE PROGRAMME AND STUDENTS, VISITS ABROAD**

Since 2003, L.E.C.T. (League of Exchange of Common Wealth Teachers, (L.E.C.T.) and the Institute jointly implements an Exchange programme of primary and middle school teachers from U.K. and India, for studying each other's education system.

Nearly 150 teachers from U.K. visited our educational Institutes during 2003 to 2007.

From 2004 - Indian teachers visited schools at London, Oxford, West Sussex, and Birmingham. Nearly 50 Indian teachers have participated in the scheme so far.

From 2005 - Students from Maharashtra visited museums & libraries at Oxford

and Cambridge and places connected with Indian culture and Independence struggle at London. 40 students so far visited U.K. under this scheme.

The Chinese government had organised Science Exhibition for Chinese school students in Kunmin in Yunan province in the year 2007. Institute assisted four students from Late A.K. Joshi English medium school, Thane, to participated and demonstrated their research project in the Exhibition.

Institute for oriental study, Thane, is the only Institute in Maharashtra, which is conducting such educational activity in India and Abroad.

An information regarding this activity is available on the Institute's website – <http://www.orientalthane.com>.

**(F) THE LIBRARY**

The Institute is running a Reference Library from 1985. The library now possesses 30,000 volumes relating to history, culture, language, arts, etc. The library has a collection of 3500 Sanskrit manuscripts. Senior citizens, research workers, journalists, and students of graduation level, frequent the library.

**(G) BOOK DONORS:**

The Institute is receiving rare and valuable books from many book donors. A mention is made of the donors of books who donated their book collection to the Institute.

1. Late D.D. Patil, Mumbai
2. Late George Morais, Mumbai
3. Late Patankar, Rajapur
4. Late Pandharinath Deshmukh, Thane
5. Late T.V. Gune, Pune
6. Shri Krishna Arjun Wadkar, Pune
7. Shri Manohar Bagwadkar, Thane
8. Late Pandharinath Prabhu, Mumbai
9. Late Ganeshshastri Shendye, Pune
10. Late S.P. Desai, Thane
11. Shri R.C. Dhere, Pune
12. Late Dr. S.A. Dange, Mumbai
13. Smt. Sindhu Dange, Mumbai
14. Dr. Sharatchandra Kopardekar, Mumbai
15. Shri V.L. Manjul
16. Dr. V.M. Kulkarni
17. Smt. Shailaja Nimbalkar, Thane

## APPEAL

You can actively participate in developing the Library and the Museum in the following ways:

- a. By donating books and manuscripts in your possession.
- b. Donating artifacts, idols, rare specimens of art, etc. to the museum
- c. You can persuade your friends and relatives to part with such things if they are in possession of the above.
- d. By cash donations.

To run all these activities the Institute requires funds. The Institute is not receiving any grant from the Government, but it is supported by private organizations. Hence all the activities are run mainly through the small contributions from well-wishers only.

The Institute expects liberal donations from you to build up the reference library and the museum. You are the better judge to decide in what way you can serve the cause and thus serve the people.

If you want any more information, please do not hesitate to write.

Yours faithfully,



(Dr. V.V. Bedekar)

Annual Donation Rs.1,000/-

All cheque to be drawn in favour of **Institute for Oriental Study, Thane.**



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## Use of Geometry and Mensuration in Construction of Fire Altar in the Vedic Age: A Scientific Advent of Ancient India

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In this paper I endeavour to establish the fact that unlike the general belief of the masses that science and religion are polar opposites there exist close links between the two. Indeed if we delve into the history of origin of science in ancient India we might find that many pivotal theorems and scientific theories to have derived their roots in the religion of the early vedic civilisation.

Vedanga an associate of Vedas has six disciplines of which Kalpa or systematic sutras for sacrificial rituals is one of the foremost. Again Shulva-Sutra is an important branch of it. The word Shulva means measurement with a cord or string. The importance of Shulva-Sutras lies in the fact that they are the only source of knowledge of Indian mathematics of Vedic Period. According to the theory of origin of altar geometry unique fire altar shape came to be associated with different boons from God. For the purpose accurate measurement and construction of different geometrical forms were required and hence the advent of Shulva-Sutras. The Shulva Sutras bear the evidence that the Pythagoras theorem, an important step to modern geometry and further to Mensuration and Trigonometry was much in use in the construction of the fire altars. Thus we see a parallel growth and symbiotic enrichment of religion and science in the early Vedic Civilisation much before it was invented by Pythagoras.

The art of transforming of square into isoscele Trapezium or Rhombus, isocles Triangle or a circle without any wastage of space was much developed, albeit in approximate measures.

Indeed these branches of mathematics gained such prominence that specific scriptures are dedicated to them and developed the so-called altar geometry.

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## Sanskrit Sounds : Their Adaptation in Oriya- A Study

Devaraj Panda

An attempt is made in this paper to study the number of sounds used in Sanskrit. It is observed that the number of Sanskrit sounds in vedic period was more than two hundred thirty one. Panini (4th century B.C) reduced them to forty two only and enlisted these sounds in fourteen aphorisms. These are found to have been adopted in written Oriya. Moreover some other sounds (b, &#x24b; and j) not mentioned by Panini are also adopted in written Oriya. The "b' sound of Oriya is absent in Assamese, Bengali and Hindi but was used in vedic period. The "s', "t' sounds might have been adopted from tribal Language spoken in Orissa. The j sound is adopted from the Sanskrit text 'Prapancharatantra' by Sankaracharya. On the other hand some sounds (F\$, b e, f) enlisted by Panini are not used in spoken Oriya. It is concluded that original Sanskrit sounds used in vedic period are lost today.

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## The art of cooking- A glimpse in Ancient India

Dr. Lalita Kuppuswamy

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The practice of fine arts was a regular feature in the cultural life of Ancient India. Among all the domestic arts, none can stand in comparison with this art of palate. Generally housewives practise this art with skill and vigour. Draupadi was a very good cook. This art was practised even by men. Bhima and Nala were experts in this art. Nala had the extraordinary power of cooking without fire. Nala in his book 'Pçkadarpa ́am' makes a reference to this. The guardians of the quarters Indra, Agni, Yama and Varuna sent Nala as a messenger to princess Damayanti to seek her hand. Pleased with Nala, the deities conferred on him various powers. Indra gave Adrshyasiddhi, Agni gave Agnisiddhi power of heating without wood, Yama Annarasasiddhi, and Varuna Jalasiddhi. And Nala utilised these powers in making different dishes and writing them in his book Pçkadarpa ́am for the benefit of humanity.

Regarding the very keen discriminative power of a person who was extremely fond of good food there is a very interesting story in Vetala Pancavimshati (a famous Sanskrit story book).

The story of Gomini in Dashakumaracaritam of poet Dandin may be remembered in connection with the art of cooking. Shaktikumara, a merchant's son decided to find out a bride for himself and set out in the guise of a palmist, with one prastha (about 4lbs) of quality rice bound in a cloth. Wherever he went, the parents of marriageable daughters showed their girls to him to read their hands. And whenever Shaktikumara saw a suitable match, he told her, showing the bundle of rice to treat him to a good lunch with that prastha of rice. The girl would laugh and turn her face away thinking him to be mad. At last he found his match in intelligent Gomini who gave a rich lunch with that rice.

Charaka emphasises that the three pillars of good health are food, sleep and self-control. The food becomes the most important ingredient. So naturally the art of making without the loss of nutrients, taking of food in proper time and in proper manner are important for being healthy.

We come across interesting details on defects of food, cooking of rice, meat, its variety and nutritive values, preparation of soups with different pulses, preparation of dishes from vegetables with their nutrition contents, various types of sweet dishes, varieties of curds, chutneys, dishes according to seasons etc. In fact the day from sunrise to sunset is divided into six parts and assigned the first part to spring and the last to winter and the food according to the nature of the season. What beautiful innovations!

This art is very scientific. We get a glimpse of it. The cook has to have certain qualifications. Birth in the same country, self-controlled, soft spoken, knowledgeable about various materials, place and time etc. He has to wash his hands and feet before cooking. Cooking has several advantages in improving quality, digestibility and palatability. At the same time cooking in a wrong manner can reduce the nutritional contents.

We find various devices to keep the dishes cool and free from spoiling due to heat.

Satisfaction of hunger is not the only primary criteria for adequate food intake. For sustaining healthy and active life, diet should be planned on sound nutritional principles.

The most striking feature of ancient culinary is that it is based on a sound base of well balanced diet because the base of food preparation is based on Ayurveda's balance of Tridoshas

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## Contribution of Satvata Dharma to Indian Philosophy and Religion

Dr. Prabhakar Apte

Pune

In the Bhishma Parvan of Mahabharata, there is a clear reference to an innovative mode of Upasana which is termed as Satvata Vidhi. Bhagwad Geeta, which forms part of Bhishma Parvan, has stressed the theme that one and the only God Vasudeva is supreme. The devotee who has firm faith in this theme is rare and magnanimous soul. Lord Krishna is said to be the promoter of an eternal Dharma the Satvata Dharma and he is also the protector: Sanatana-Satvata Dharma-Gopta. The Kashmir recension of Mahabharata has a variant reading as Satavata-Dharma-Gopta. It is apparently the hereditary religion of Yadu dynasty in which Krishna was born. The Satvata Dharma believed in the supremacy of one god and for cosmological evolution, that religion had a metaphysical doctrine of Vyuhas or divine manifestations: Vasudeva, Sankarṣaṇa, Pradyumna and Aniruddha. Those four manifestations called Chaturvyuha were equated with four states of consciousness of soul, namely, Jagruti, Swapna, Susupti and Turya that is the states of wakefulness, dream, deep sleep and trance. These four states have been explained in Mandukya Upanishad. The equation of the four manifestations of the supreme Lord with the states of consciousness of Jeeva is the innovation of Satvata or Panchratra metaphysics. The hypothesis is that Paramatma and Jeevatma are sentient beings and as such they enjoy the four states of consciousness. In the case of Jeeva, those are Jagruti, etc. and in the case of Paramatma those are the states of divine manifestations. It is presumed that Paramatma in Yoganidra represents the state of yogic sleep prior to cosmic evolution. However, there is a will to create dormant in him that will ease termed as Sishiksha in Satvat-Panchratra philosophy. A supra-cosmic state is marked by four phases when that 'will' undergoes the phases:

- 1-Existence and light,
- 2-Internal
- 3-Forward flash and
- 4-Irresistible manifestations.

The names Vasudeva, Sankarṣaṇa Pradyumna and Aniruddha are simultaneously etymological terms to explain those divine states. The next proposition of Panchratra philosophy is that the supreme soul as well as individual soul are sentient. Hence, they experience as well as enjoy the transitional scenery while themselves remaining unchanged as knowers and enjoyers. Their role is of Jnata and Bhokta. Further it is stated that the trance state of supreme soul, called Vasudeva is the quiet state prior to cosmic creation.

In between those two extreme points are two intervening stages, wherein the divine will to create reaches progressive growth. Those two stages are Sankarā and Pradyumna. Pradyumna state acts like flashes of torch but it works internally like the experience in dream. At the state of Aniruddha, the divine will defies all the restraint and reveals in the form of the world seen by all, around. Saivata Samhita (ca.3<sup>rd</sup> C.A.D), the representative text of Saivata Dharma has put forth a model of Brahma Yupa or Vishakha Yupa to explain the doctrine of Vyūhas.

It is said to be a cosmic pillar existing in Vaikuṅṭha. It has got four facets facing four directions and four vertical sections. An optical model has been prepared to demonstrate that theme to explain to the august gathering as a visual aid.

A book by name 'Pāncarātra: An Advaitic approach' written by A.R. Bhat of Delhi, tries to find Advait in Pancaratra philosophy. However the exact label for Pāncarātra philosophy would be Vyūhadvaita. It's main features are that the ultimate reality according to Pāncarātra philosophy is dynamic in nature and its conception of emanicipation of soul is also dynamic. On social plane, the doors of this Saivata Dharma are open to all strata of society. Brahmins, Kshatriyas, Vaishyas as well as Shudras. The main ritual feature of this Dharma is described in one sentence as 'inshrined image worship, round the clock and around the year. Unlike vedic religion is culmination of Dvapara Yuga and beginning of Kali Yuga and it has continuous tradition till today. Yupa to explain the doctrine of Vyūhas.

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Innovations and Inventions in Ancient and Medieval India

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# Ashtanga Vastushastra: An Overview on Innovation and Invention

Dr. Rahul V. Altekar

Mumbai

Innovation and Invention is the part of human evolution. Innovation is typically understood as the introduction of something new and useful, for example introducing new methods, techniques, or practices or new or altered products and services. Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice. It is very interesting to analyze these concepts in Vastushastra context. Attempts are made here to present the traces of innovation and inventions in Ashtanga Vastushastra. Vastushastra, or “The Hindu Style of Architecture and Civil Engineering”, is the classic example of innovation and inventions of the ancient Indian scientific and engineering principles. This paper presents the key concepts of Vastushastra, its evolution and its eight elements (Ashtanga). The focus is on revealing how the innovative and original ideas gathered in Vastushastra, which took over period of time adding more and more functionality chronologically.

According to Bhrgu Samhita, Vastushastra is one of the ten branches of Silpasastra, and basically deals with abodes of human beings, their animals, their trees, and the Divinity. Thus it has its ambit much beyond the “shelter for human” concept. In fact the history of the Vastushastra begins with history and the origination of the earth; the creation of continents, oceans, rivers and countries. Right from Mohenjo-daro and Harappa civilization, we can link the principles of this science employed in building the various structures in India. Therefore we can see the finest houses forming the towns of Indus civilization and even the temporary erections or rudimentary structures of reeds and bamboo observed in this country, exhibiting more or less same symbolization.

The scope of Vastushastra is clearly defined in Silpasastra texts and we can conclude that it is a little pure science and more is in the integrated form of applications of Cosmology and Philosophy, Geology and Geography, Astrology and Astronomy, Psychology and Sexology, Algebra and Geometry, Ergonomics and Ecology, Mechanical and Civil Engineering, as well as Biology and Medical Sciences. In other words Vastushastra has its underlining principles deeply rooted in

Dharmasastra, Khagolasastra, Silpasastra, Ayurveda and Kamasashtra. In today’s language we can say that Vastushastra is the applied science based on Social Sciences, Material Sciences and Biological Sciences. The Ashtanga Vastushastra (AVS) is the concept that marks the timeless principles of Vastushastra, which were explored and practiced in ancient India, and clubbed with logical and convenient manner. It deals in detail with all the aspects like, plot selection methods, emphasis on rituals and

symbolization, structural designs, various types of building materials, tooling, dimensions of various rooms, sanitation aspects, water supply and gardening, space utilization, apertures, ergonomics involved, astronomy and astrology considerations, colors, flooring, wall design and decorations, furniture, etc. We could clearly see the direct impact of pure social sciences like behavioral sciences, anthropometrics, psychology etc. on these aspects of Vastushastra. The whole idea of this Vastushastra is to help produce satisfaction, comfort and all sorts of prosperity to the dweller or the owner of the home, called Yajamana. The underlying fact that the human should achieve along with his family, live belongings and the overall society, the fulfilment ( Brahma) status forever. Vastushastra thus reflects a matured approach of social science principles.

In this paper the three key elements of AVS, namely- Yajmana, Silpi and Sthapatya are discussed. The various original ideas related to these elements are presented to emphasise the practice of innovation and invention followed in VS days. Finally the paper talks about the learning that modern society could grasp from VS in terms of innovative practice.

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Yours faithfully



(Dr. V.V. Bedekar)



Seminar on Innovations and Inventions in Ancient and Medieval India  
Saturday 29<sup>th</sup> December, 2007

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**Silver Jubilee Year**

*Seminar on*

Innovations and Inventions  
in  
Ancient and Medieval India

Saturday, 29th December 2007

**ABSTRACTS OF PAPERS**

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