

CO-EXISTENCE OF TRADITIONAL AND SCIENTIFIC CULTURES: AN EMPIRICAL STUDY DURING KUMBH 2001

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Abstract

Beliefs and superstitions prevalent in the society are integral part of the human existence. The strong cultural bond between society and these beliefs is quite hard to break. The cover of education and development in science, have contributed for the rational thinking in the society, but still some integrated approach is needed for superstition-free society. The superstitions associated with science or scientific phenomena are more abundant in the society as people apprehend a) contradiction of science with religion and b) scientific research and discoveries have generated more and more questions to be probed. The present paper is a step ahead and tries to reveal socio-religious basis of beliefs and superstitions and existence of these systems in the society along with the scientific knowledge. The hypothesis has been put to empirical test for the data collected during Kumbh-2001. The qualitative as well as quantitative analysis revealed that the superstitious responses or beliefs for science are widely distributed among the Indian public irrespective of peoples' education level. The type of superstitious (qualitative) responses showed various shades of (mis)-belief for more complex scientific aspects rather than simpler one.

Keywords: Belief, Culture, Scientific knowledge, Kumbh.

Introduction

In order to cope and survive in the world, human being must make observations and draw conclusion about the universe. This forms the basis of any belief system in the society. Thus, formulating a belief system, human survival and perhaps man's consciousness are the essential components. In other words or in social context belief is an assertion, claim or expectation (as per consciousness of human being) about reality that may be true or false. And it is thought to be the simplest form of mental representation of the human and therefore, one of the building blocks and basis of conscious thought.[1]

A Belief System is a way of thinking -- a comprehensive set of beliefs that reinforce one another because they have a kind of logic that allows believers to prove beliefs true. The foundation of a belief system is a set of axioms -- assertions that are by definition true yet cannot be proved. So if a Belief System has to survive in the system it should satisfy the need of its host. And sharing of a belief with others is very important for the survival of a belief system, otherwise belief ceases to remain with the social system and does not have impact in the society. The most prominent systems of beliefs tend to be those associated with formal religions; however, any system of belief in which the interpretation of stories affects people's behaviour -- a system of superstitions, for example -- can be a living, contributing component of a given society's traditional culture.[2]

It should be made clear here the difference in the related terms like faith, superstitions, knowledge and scientific culture, to be more specific. Faith means belief in relationship with a deity but has meanings like trust, belief or confidence. But unlike these terms faith tends to imply a transpersonal rather than interpersonal relationship. [3]

And superstition or myth is a wrong or an incorrect belief about the relation between certain actions (often behaviors) and other actions. The practitioner believes that the future, or the outcome of certain events can be influenced by certain specified behaviour. Not only do notions of "good luck" and "bad luck" give rise to many superstitions, such as the belief that it is "bad luck to" wear gold and silver together, the whole notion of 'luck' is itself a superstition. Superstitions are not based on the reason and can be prompted by misunderstanding, unenlightened fears, supernatural inventions, and can be expressed in religious beliefs and fears.[4]

Superstition, which is a strong component of the belief system, can be defined as 'An irrational belief that an object, action or circumstance not logically related to a course of events influences its outcome or a belief, practice, or rite irrationally maintained by ignorance of the laws of nature or by faith in magic or chance'.

Superstitions say a lot about, who we are, how we feel and think about our world. Superstition is also a good example of a type of belief that you can choose not to 'buy into'. Those who choose to believe find their world delivering what they expect and those who don't are not affected.

These belief systems prevailing in the society, various faiths, superstitions and myths have been part of the culture and traditions in the social system of which human being is the central part. Culture and traditions have their ultimate roots in the religious patterns one follows. In the process of acquiring culture and tradition the myths/superstition or association with super power Almighty prevails in the society according to existing traditional culture. These myths/ superstitions vary from society to society, religion to religion and also vary from region to region within the same society. Myths/superstitions are typically defined as traditional views, fables, legends or stories related to some process or phenomenon. As such, myths can be entertaining and even educational since they help people make sense of the world. However, when fact and fiction blur, myths lose their entertainment value and serve only to block full understanding. [5]

Some Recent Episodes of (mis) belief in Indian Society

- **On 24th March 2005** the national dailies in India, especially Delhi editions, were filled with the news that a *witch* prowl on the streets of Delhi has caused a scare among sections of people (*By Indo-Asian News Service*). It (witch) is painted as mean, hungry for onions and perhaps thirsting for blood and whosoever offer her onions dies as soon as onion is cut into two pieces. People in and around the metropolitan city took preventive measures (as suggested) by marking palms prints soaked with henna and turmeric at the front door of their houses. Even public said to be aware and educated perform the ritual of putting the prints of henna and turmeric.
- In **May 2001** similar news spread for a '*monkey man*' with metal helmet and claws, with glowing red eyes and the '*monkey man*' terrorised people in the city. [6]
- The news that idol of Lord '*Ganesh*' sipped milk (**21 September 1995**) was not even restricted to Indian boundaries but people of Indian origin staying in different foreign countries offered milk to the god's idol at their respective places/temples.
- These news pieces are not new to Indian society because it was thought that the pavement-dwellers were crushed to death with by a '*stone man*' while they were asleep at night in different areas of central Calcutta long back in **1980**. [7]

Knowledge and Science

Whereas, knowledge is said to be justified true beliefs, in that the belief must be considered to correspond to reality and must be derived from valid evidence and arguments. Or knowledge is information combined with and based on experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decisions and actions. [8]

Apart from the above discussion, science is a system of acquiring knowledge, which is based on empirical experimentation, and aimed at finding out the truth. The term science also refers to the organized body of knowledge, which humans have gained by conducting research. Science mainly tells us 'how' rather than 'why' – only where some logic has to be used to explain a phenomenon. Science uses a set method called 'scientific method' to arrive at results, which tells facts about a particular scientific phenomenon stating how it happens and generally covered under 'scientific culture'. Science does not need vigilantes to guard its gates. Science has been successful because good science drives out bad science. In the process of development the relationship between science and traditional culture has not remained segregated. Many developments have been achieved in Science and Technology and have accumulated by discarding older views, but the one thing that has remained the same from the very time of Aristotle is Astrology. There are occasion where science and traditional thinking have disagreement with each other, and there are other areas where no such clash exists. The relation between science and traditional culture generally is a matter of concern to both scientists and non-scientists. [9] [10] [11]

Tradition, Science and co-existence

For survival in the society, once established a belief system needs to protect itself from competing belief systems. It protects itself by including beliefs that fight off other belief systems. A strong belief system protects itself by "picking fights" but only the fights it can win in the majority of minds it inhabits. For example, a religious belief system may include the belief that theirs is the only True God, and other religions worship false gods. So two

competing religious belief systems can't occupy the same mind. They will fight each other until one wins. Some religious 'Belief Systems' pick fights with the 'Scientific Method' too by including a belief that the scientific method is false. This is a fight the religion might lose in many minds, so many religions choose to temper their beliefs in such a way that both the 'Religious Belief' and 'Scientific Method' can occupy the same mind at the same time. So beliefs are included in a 'Belief System' to drive out competing weaker 'Belief Systems' but they avoid competing head-on with stronger 'Belief Systems'. [12] [13]

Besides being occupying the same mind at a given point of time, religious belief has fight with the science regarding the rationality and where religion becomes weaker against science. There is logic with science based on the facts and experimentation, but there is logic with the religious belief based on some story, episode etc. Science has been developing continuously and has presented results discarding older views present with the scientific world and accepted by the system. These developments may be contradictory to the religious beliefs and there is every possibility that science is put under screening to become part of the social belief system. The very good example of the same can be traced back to the propagation of heliocentric rather than geocentric theory (as has been part of the religious belief system) of universe put forth by Galileo. The society bound by religious belief was not ready to accept and give sanction to this heliocentric theory. [14]

Because of these two different cultures there has always been a distance between what has been part of the traditional viewpoint and what has been evoked by new or scientific tradition. Before, being part of the social system, knowledge (scientific culture) has to pass through this distance. There can be various scales on which the distance can be measured and there are factors intrinsic and extrinsic associated with the scientific culture, which determine the distance and flow of the culture to become part of the society. And in the modern times, it has been hypothesized that education is one of the important extrinsic factors, which reduces the distance between the scientific culture and the traditional. [15] [16]

The present article analyses the public responses towards some phenomena related to science (astronomy and cosmology), and also to analyse what kind of different view-point or belief systems are prevalent in the society related to these scientific phenomena. The co-existence of traditional culture and scientific culture in the society is well established within one area of knowledge. The article is based on the survey conducted during **MahaKumbh-2001**¹ held at Allahabad, where more than 4000 respondents were interviewed through an open-ended questionnaire and analysis is done for 3484 respondents after data cleaning. The questionnaire contained six areas of knowledge namely astronomy & cosmology, geography & climate, agriculture, health & hygiene, bio-technology, and environment. The paper explains the analysis of seven questions posed to the respondents and an attempt has also been made to analyse the response behaviour *vis-à-vis* to education of the respondents. [17] [18]

Characteristics of the Sampled Population

In addition to the questions posed to the respondents about the natural phenomena, information regarding their age, education, gender, occupation, cultural interest, sources of information, geographical location to which they belong, family-size and family education etc., was also collected. This information use to have impact on the responses of the respondents and analysis was made constructing these factors as independent variables. It is important to describe some of these factors, in brief, before analyzing the data in details.

¹ a congregation of millions of people, gathering at the bank of confluence of two sacred rivers of the country to celebrate the religio-cultural festival, held after every twelve years.

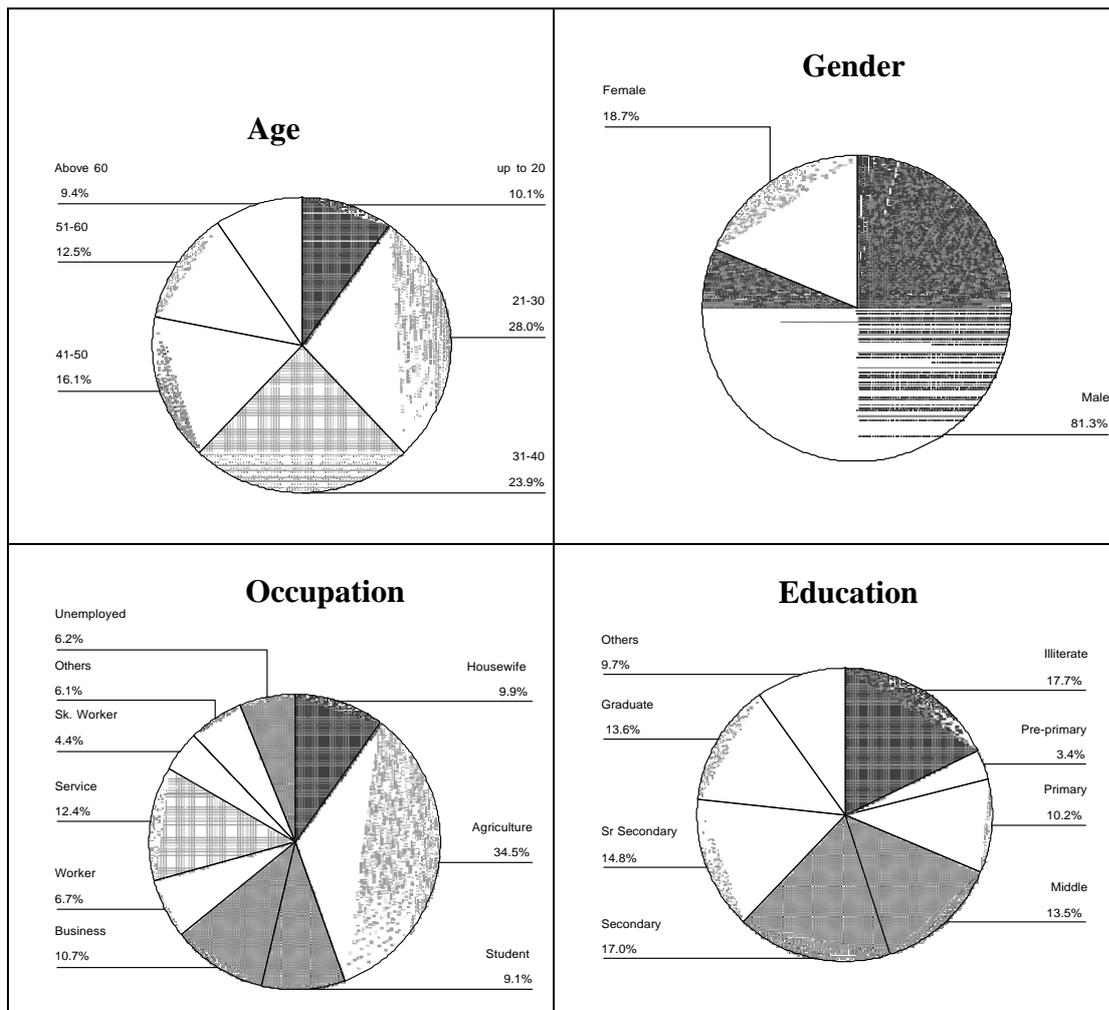


Figure 1. Characteristics of the Sample

Age:

Figure above depicts the age-wise distribution of the sampled population. This reveals that 10.1 per cent of the respondents were up to 20 years of age, 28 per cent in the age group of 21-30 years, about 24 per cent in the age group of 31-40 years. So, more than 60 per cent of the total sampled population was up to 40 years of age. Though, respondents with age more than 40 years were lesser in percentage but 16.1 per cent in the age group 41-50 years, 12.4 per cent in the age group 51-60 years and only 9.4 per cent respondents were more than 60 years of age.

Gender

81.3 per cent of the population surveyed during *MahaKumbh-2001*, were male while 18.7 per cent were female. This is in spite of the fact that almost 50 per cent of the enumerators were female and every effort was made to educate the female enumerators to interview a female respondents.

Occupation:

About half of the women's population or 9.9 per cent of the total population were housewife and were looking after their families by doing domestic chores only and not involved in any other productive activity. 34.5 per cent of the sampled population (men and women) were engaged in agricultural or farming activities though not necessary that they own piece of land. 9.1 per cent respondents were undergoing formal education, and 10.7 per cent were engaged in service sector selling various items to retailers and consumers or owner of small and cottage industrial unit or having shops or were auto-rickshaw owner etc. 6.7 per cent of the respondents were engaged in non-agricultural work mainly in un-organized sector and their work did not require specialized skill like casual workers in civil construction, rickshaw puller, vehicle cleaner etc. 12.4 per cent respondents included employed in

various private and government organizations. 4.4 per cent of the sampled population was categorized as skilled worker, which includes carpenter, potters, blacksmith, technicians, mechanic, artisans etc. Out of the sampled population 6.1 per cent were engaged in activities other than the mentioned and also includes advocates, doctors, journalists etc. and about equal percentage of the population responded were not involved in any productive activity and hence termed as unemployed.

Education

Out of the total sampled population 17.7 per cent were never exposed to any formal system of education or formal schooling and termed as illiterate in that sense only. 3.4 per cent responded that they have been educated up to 3rd standard (pre-primary) while 10.2 per cent have studied up to 5th standard (primary). 13.5 per cent had studied for 6th, 7th and to 8th standard (middle), 17 per cent educated for 9th and 10th standard (secondary), 14.8 per cent studied for 11th and 12th standard (Senior Secondary). 13.6 per cent of the total respondents had been to the college or had undergone formal education after passing 12th standard (graduate). 9.7 per cent termed as 'others' includes post-graduates, lawyers, doctors and those could not be covered in the above said categories.

The present analysis is based on the analysis made across the four above-mentioned independent variables, such as age, gender, occupation and education taking only one area of knowledge i.e., astronomy and cosmology. The following paragraphs explain the response analysis and show how the respondents have provided responses in relation to the questions posed to them. The description given below establishes that respondents do not restrict their explanation to one set of thought, rather there is existence of scientific, and traditional (is further divided into scientifically incorrect and extra-scientific) explanation to the queries related to scientific phenomena.

Respondents' Perception in the area of astronomy and cosmology:

The analysis has been divided into three main categories namely i) scientific facts in which response for two questions have been analysed, ii) scientific process in which again two questions have been analysed for the paper and iii) scientific theory, in which one question posed to the sampled population has been analysed. This categorization has made a sort of scale of level of difficulty from simpler (shape of the earth) to the more complex theory of evolution.

Scientific Facts

1. The first query posed to the respondents was about the 'shape of the earth'. As high as 82.8 per cent of the total respondents gave the scientifically correct response and 8.1 per cent could give incorrect and 9.1 per cent respondents responded 'Don't know'. The correct response in response to this fact that 'the earth is round' is very high as compared to the other question in the area. On the basis of the observed frequency distribution it was concluded that the rotundity of earth has become an integral component of culturally tutored cognitive structure of a large segment of the common citizens. This information is not a part of any traditional cultural structure of thinking. The rotundity of earth is taught in formal schools and gradually has become part of the language, proverbs and even the songs in colloquial vernaculars.

2. The second question posed to the respondents was related to gravitational force exerted by the earth on objects. 68.7 per cent of the total respondents provided the correct response to this question, while 9.9 per cent provided incorrect responses such as 'things come down because there is nobody to hold it up' mainly because of one's observation that there is nothing to keep it up, or 'because of air pressure' etc. In addition to this 3.5 per cent also provided the response that things when thrown upwards come down because of God's grace or Almighty's grace. So this section neither knew the scientific basis nor responded on the observation but kept the phenomenon solely on the grace of Almighty.

Scientific Process

1. The first question posed to the respondents was regarding the rotation of earth/ occurrence of day and night. In response to this question 52.6 per cent of the sampled population responded scientifically correct, 17.8 per cent provided incorrect responses such as 'Sun revolves round the Earth', 'revolution of moon', 'rising of Sun' or 'change in time' and 7.9 per cent responded that this is the 'secret of Almighty God'.

2. The next question in the area was related to occurrence of eclipse. In response to this question 50.5 per cent of the total sampled population responded in terms of obstruction of sunlight by moon or earth. 7.2 per cent

responded that eclipse occur ‘Due to shadow of stars fall on Moon or Sun’ or because of ‘tropics of Cancer/ Capricorn’ and 16.4 per cent responded in terms of ‘Rahu and ketu’ and ‘God’s grace’ and termed as extra-scientific.

Scientific Theory

The last question in the area of astronomy and cosmology was related to the evolution of man to have perception about the theory of evolution. In response to this question 18 per cent respondents could provide correct explanation regarding the theory of evolution, 19 per cent could provide that man evolved out of monkey, Man evolved from Lotus petals, Man evolved from fishes or insects and hence termed as scientifically incorrect response, 32 per cent could provide in terms of Brahma’s creation or Adam’s creation or God’s creation termed as extra-scientific and 31 per cent could respond ‘don’t know’. It is important to note here that most of the respondents carried the discussion long in explaining the logic of this God’s creation of life on earth.

Table 1 Showing percentages of types of responses provided by the respondents

	Facts		Processes		Theory
	Shape of the earth	Gravity	Rotation of earth	Occurrence of Eclipse	Evolution
Scientifically Correct	82.8	68.7	52.8	50.5	18.1
Scientifically Incorrect	8.1	9.9	17.8	7.2	19.0
Extra-Scientific	--	3.5	7.9	16.4	31.5

Role of education

In addition, there was no extra-scientific response to this question among the respondents. But 8.1 per cent responded that the shape of the earth as flat or long or beautiful etc. With the increase in exposure to formal education of the respondents the correct response increased from 56 per cent among ‘illiterate’ to 99 per cent among graduate and above. And the scientifically incorrect response decreased from 15 to 0 per cent. Male respondents were higher in percentage (85 per cent), who provided correct response than female (73 per cent) but this difference is mainly because of difference in ‘don’t know’ response rather than incorrect.

Education has positive co-relation with the correct response and negative co-relation with incorrect and extra-scientific responses. The scientifically correct response increased (from 30.8 per cent among ‘illiterate’) with increase in education level of the respondents to 94 per cent among ‘graduate’ and above and the incorrect response decreased from 17.7 per cent among ‘illiterate’ to 1.8 per cent among highest level of education level. Similar to incorrect response, the extra-scientific response also decreased from 10 per cent among ‘illiterate’ to about 1 per cent among highly educated respondents. The incorrect and extra-scientific responses are more prevalent among women compared to men among the sampled population.

The correct response percentage increased from 19 per cent among ‘illiterate’ to 80 per cent among ‘graduates’ and above with increase in education level. And the incorrect response decreased from 19 per cent to about 10 percent while the extra-scientific response decreased from 20 per cent to 2 per cent, from ‘illiterate’ to ‘graduates’ and above. Male (55.8 per cent) are better placed compared to female (38.4 pr cent) respondents in respect to scientifically correct response but incorrect response is almost similar in percentage among male and female respondents (about 18 per cent). Extra-scientific response is more among female respondents (12.6 per cent) compared to males (6.8 per cent).

With the increase in education level of the respondents the correct response percentage rose from 19 per cent among ‘illiterate’ to 82 per cent among the ‘graduate’ and above. There is negative co-relation of education with incorrect and extra-scientific responses. The incorrect response percentage decreased from 11 per cent to 3 per cent and ‘Rahu and ketu’ response percentage was down from 27 per cent to 7 per cent. Males are more in

percentage providing correct responses than females and are almost equal in percentage providing incorrect responses. But females are more in percentage providing extra-scientific response, than the males, for the occurrence of eclipse.

The education increase of the respondents had strong bearing on the correct response and the percentage increased from 8 per cent to 35 per cent from respondents who did not undergo formal schooling to 'graduate' and above. The increase in the correct response was mainly because of decrease in 'don't know' response rather than the incorrect or extra scientific responses. The percentage of correct response was slightly more among men (19 per cent) than the women respondents (14 per cent).

Further Probing

The table below is very important to note the response behaviour of the respondents obtained by cross tabulation of the two question i.e., one from scientific process and other from scientific theory. As far as the hypothesis is concerned that the two culture co-exists with minimum contradiction with each other has been reinforced with the results obtained in the table. Even, those who have scientific knowledge about the rotation of the earth were very high in percentage giving extra-scientific explanation (traditional beliefs) regarding the evolution theory. And above all the percentage of those who already have incorrect explanation to rotation of the earth were very high in percentage providing extra scientific and incorrect explanation to the evolution theory.

Table 2: Rotation of Earth vs Theory of Evolution

		Theory of Evolution		
		Scientifically Correct	Scientifically Incorrect	Extra-scientific
Rotatio of Earth	Scientifically Correct	22.7%	24.2%	28.6%
	Scientifically Incorrect	11.6%	9.3%	45.2%
	Extra-scientific	9.0%	16.4%	45.1%
Total		18.1%	19.0%	31.5%

Conclusions:

The respondents provided almost all sort of explanation to various scientific phenomena ranging from correct scientific explanation to incorrect and extra-scientific existed in the society. All sets of belief systems whether scientific, materialistic or superstitious, both part of the traditional culture, forms part of the public understanding related to some natural scientific phenomenon.

The only exception to this was found to be the query related to scientific facts (shape of the earth). All sorts, popular songs, stories and proverbs do disseminate concept of a round earth hence, despite absence of such notion in traditional structures of sampled population knew the correct shape of the earth and hence extra- scientific explanations were all together missing in the responses of the sampled population.

As one more from simpler to comparatively more complex scientific queries it has been found that percentage of respondents providing other than scientifically correct explanation, increased. It is not only that there is quantitative increase but there is qualitative change in response pattern has also been observed. In the areas of scientific process and scientific theory more types of scientifically incorrect and extra-scientific responses have been observed as compared to the query regarding gravitational force.

Respondents even when they were not exposed to formal system of education, have provided scientifically correct responses even to relatively difficult question (scientific process). But exposure to formal education system has its impact on the knowledge-base of the respondents and with the increase in educational level the percentage of correct response increased while the percentages of other responses decreased. Authors have somewhere else compared the impact of education with other independent variable, and has found that though education is an important factors, which enhance the scientific culture but it is not the only factor that influences scientific

knowledge-base. Other factors like age, gender, occupation, interest in cultural activities etc. do have their impact on response behaviour in the society

Percentage of the respondents providing scientifically incorrect explanations to less complex scientific phenomena, were very high in percentage giving extra-scientific explanation to comparative more complex phenomena.

References

- [1] www.wsu.edu:8001/vcwsu/commons/topics/culture/values-beliefs/values-beliefs-intro.html
- [2] www.mcracian.com/r/beliefsystem/htm
- [3] A. K. Mazumdar, "Faith and Reason: The Indian Scene and Experience," *The Asiatic Society*, Calcutta 1999
- [4] www.infidels.org/library/historical/robert_ingersoll/superstition/
- [5] G. Raza, S. Singh and B. Dutt, "Peoples' Attitude to Scientific Knowledge: The Context of Culture", *Journal of Scientific and Industrial Research*, vol. 54, pp.108-121, Feb. 1995.
- [6] www.strangemag.com/monkeyman.html
- [7] www.telegraphindia.com/1030312/asp/calcutta/story_1756889.asp
- [8] A. Goldman, "Social Epistemology", *The Stanford Encyclopaedia of Philosophy*, Spring 2001 Edition
- [9] www.en.wikipedia.org/wiki/Science
- [10] A. Goldman, "Education and Social Epistemology", *University of Arizona*, 1995
- [11] www.serendip.brynmawr.edu/sci_cult/index
- [12] A. Rehman, "Anatomy of Science" *National*, Delhi 1972
- [13] B. Godin and Y. Gingras, "What is scientific technological culture and how is it measured? A multidimensional model", *Public Understanding of Science*, vol 9, pp. 43-58, 2000.
- [14] G. Raza, S. Singh and B. Dutt, "Public Understanding of Science in Complex Cultural Structures", *Journal of Scientific & Industrial Research*, vol. 59, pp. 460-470, June 2000.
- [15] C. P. Snow, "The Two Cultures". Cambridge, UK. Cambridge University Press, 1993.
- [16] G. Raza, S. Singh and Bharvi Dutt, "Public, Science and Cultural Distance", *Science Communication*, vol. 23 No. 3, pp. 293-308, March 2002.
- [17] G. Raza and S. Singh, "Tryst with Science: A report based on survey study conducted during Mahakumbh-2001 at Allahabad", *A NISTADS Report*, 2001.
- [18] H. Bhattacharya, "The Cultural Heritage of India, Vol. IV", *The Ramakrishnan Mission*, Institute of Culture, Calcutta, 1956.