

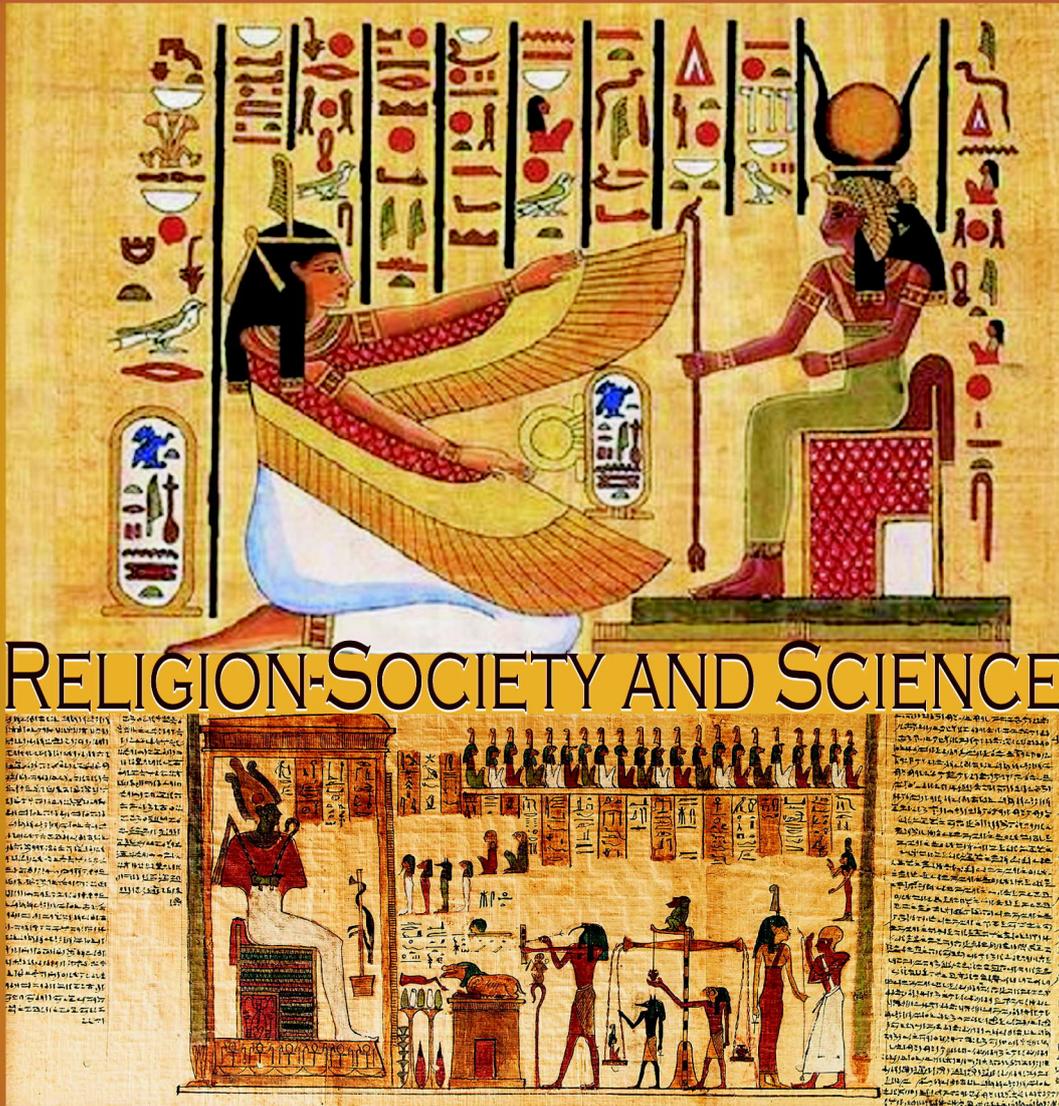
Landing of Chang-4 on the other side of the moon

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Editorial :

Science-Mindedness

In today's society most people are denied the benefits of science and fail to inculcate a scientific attitude. Science is the study of the laws and causes of the origin, development and destruction of matter. This law is the law of ever changing material world. A study of the history of human civilization leads to the observation that the rate of development of the human civilization since its origin till the eve of industrial revolution in Europe was slower in comparison to that of the modern age. Actually the development of human society is commensurate with the development of production. Clearly, since the industrial revolution development of production has been accelerating at a tremendous pace. That the reason behind it has been the development and application of science and technology in production is beyond doubt.

The history of primitive man had been the history of classless society. In this society, groups or coalitions of individuals confronted with the forces of nature. They gathered food and hunted down animals. The most notable achievement of mankind during this phase was the use of weapons. Improving the efficacy of weapons and tools with experience, the development of language, the use of fire, animal husbandry and eventually the emergence of agriculture – marked the beginning of human civilization.

Agriculture was the base of all ancient civilizations discovered so far. It means that agriculture was the basic form of production in human society. Man had been continually trying to improve tools and weapons in order to enhance production and to gain better leverage in his confrontation with wild predators.

In course of this endeavour to make more effective weapons, at one stage, man succeeded in

devising a weapon with the help of which a single individual alone can tackle a fierce animal. Such a weapon or tool was the precursor of private property. Although the emergence of agriculture brought human society into the fold of production, it couldn't meet the needs of the then society. At the same time, it became possible for the first time to preserve food for a limited period of time. The owners of developed tools became the heads of society. Society became divided into classes. Appropriation of produced commodities on the strength of ownership began. Eventually owning and inheriting private property became the norm in society. At the early stage of this phase those caught as prisoners during armed conflicts between contending groups, were killed forthwith. Later, when it became clear that if more people are engaged in production, they could be made to produce more than they need for their subsistence, the practice of turning prisoners of wars into slaves and harnessing them into production started. With passage of time, the majority of people were yoked into production. Production increased, and surplus was generated after having fulfilled the needs of the slave owners, but the needs of society's commoners were not satisfied.

Starting from the slave system, through the feudal era right till the eve of industrial revolution, had the ruling classes distributed the total annual produce among their citizens instead of amassing them, the needs of all the inhabitants of those states wouldn't have been met. The properties of the royal families are essentially the accumulated properties of successive generations. The equality of the primitive communistic society i.e. prehistoric society was beset with scarcity. Every member of that society suffered from want. In class divided society the ruling classes, having rid themselves of want, started enjoying the surplus that was produced. But it's impossible to fulfill the needs of the working people in such societies.

In Europe, People started understanding the

laws of nature during the pre capitalist period. Whatever little we have learnt about nature so far, the knowledge gathered by mankind during the last few centuries is unprecedented both in quantitative and qualitative terms with respect to the entire human civilization. This meagre knowledge about nature, demolished notions that had been handed down over thousands of years and uncovered the truth behind imaginary supernatural events. During that period, science-mindedness meant exposing the essence of apparently mystical, paranormal events in the light of scientific reason. This very act of exposure harmed the vested interests of the contemporary ruling classes and led to the torture and punishment of philosophers and scientists like Socrates, Galileo and Bruno.

In Europe, from the industrial revolution onwards, thanks to scientific and technological discoveries and applications, production increased by leaps and bounds. It has led to the transformation of capitalist economy to such an extent that today this economy has become hostile to the development of science. Development in production has got bogged down in the crisis of overproduction in accordance to economic laws. Most people realize science, while reaping its benefits in their day to day lives. As the benefits of science commodities are sold against money through trade and commerce, they cannot satisfy the requirements of the overwhelming masses. The freedom of trade stand against the freedom of fulfill the needs of the vast majority of the people.

For the masses who are deprived of the boons of science, explanations of supernatural phenomena provide nothing but the thrill of watching magic shows. This is so as scientific discoveries/inventions and their applications in their everyday lives remain a pipe dream for the overwhelming majority. And they readily embrace easily available cheap, make-believe unscientific means. In today's world the discoveries revealing the es-

sences of nature no longer harm the vested interests of the ruling classes. On the contrary, as it's now possible to create new business opportunities on the strength of the researches of scientists like Peter Higgs, Stephen Hawking, the interests of the ruling classes are being strengthened. The triumphal march of science that began with the uncovering of Nature's mysteries is now being increasingly confined to producing commodities for businesses. All the big commodity producing companies have built captive laboratories in order to produce commodities that are likely to help them stay competitive in the market. Yet scientists all over the world are being forced to hit the streets demanding funding for fundamental or basic research.

So today, the significance of science mindedness is-removing the obstacles to a social system that would ensure access to the benefits of science and technology for the vast masses and would be conducive for fundamental research.

So far it has been noticed that in every social system the development and application of science and technology and the evolution of tools and machines of labour reaches such a stage, having developed the productive force prevalent in that society where the old production relation becomes obsolete. The steady march of science slackens for a while. New social systems, new production systems emerge through class

struggles. The forward movement of science gains pace. In every new social system production increased in comparison to the previous social system.

Application of science and technology, hand in hand with the evolution of human society has enhanced production to such an extent that it's now possible to fulfill the needs of the entire human race. And once this goal is achieved human society (classless) would be able to collectively engage in unearthing the secrets of nature.

Clearly the production relation of the present society is unfavourable to this. As the elements of the future society (socialist society) are blossoming within it, the present capitalist production relations have proved obstacles to societal development. In Socialist society an economy geared to meet the needs of the masses will bring an end to uncertainties and despair in the lives of human beings. Blind beliefs and superstitions will be relegated into fossils of the 'Missing Link'.

Therefore the one and only programme of all science minded people, science activists and science organizations is – to engage in the struggle to transform the present economy which stands as a stumbling block to the fulfillment of the objective needs of mankind – which, to all intents and purposes, means engaging in the struggle to establish socialist society. ■

Read Bangla Organ of Bigyan Monosko, West Bengal

A quarterly magazine published since 2011

বিজ্ঞান মনস্ক'র মুখপত্র

সমীক্ষণ

Current Topic :

Indian Science Congress and the history of science in India – *some relevant discussions*



“I attended one day (of an earlier Congress) and very little science was discussed. It was a circus. I find that it’s an organization where very little science is discussed. I will never attend a science congress in my life.” -Venkataraman Ramakrishnan said while responding to the question regarding his non attendance at the Indian Science Congress at Mysuru or Mysore (2016) [source: Times of India ,January 6,2016]

Before we get on to the main topic let’s take a look at some information pertaining to the Indian Science Congress (ISCA).ISCA began its journey in 1914 in colonial India. It’s headquarter was in Calcutta. This institution was launched due to the initiative of two British chemists, namely, Professor J.L Simonsen and Professor P.S. Macmahon. Its objective was to inspire researchers through annual conferences somewhat on the lines of the British Association for the Advancement of Sciences. At present more than 30000

scientists are members of ISCA; every year the Congress is convened by ISCA and held between 2nd and 7th January. Apart from this advancing and promoting the cause of science in India and publishing journals and other relevant publications are the declared objectives of ISC. Currently the ISC sessions are attended by scientists from all over India belonging to all the fields. Elected scientists are given awards .A number of scientists from abroad (quite a few Nobel laureates among them as well) are invited every year. The Indian Prime Minister inaugurates the session. The session has a certain theme every year. For instance the theme for the 106th Congress (3-7 January 2019) was **Future India: Science and Technology**. Though it has not been much of a talking point in the media, this Congress has acquired the status of the lavish Rajasuya Yagna (ritual consecration of kings in ancient India) in the concerned camp.

The buzz around the science congress doing the rounds for the last few years has been for a different reason altogether and that has not been confined to the sessions of the congress. The other reason is during the sessions, outside the periphery of the sessions, in other words, everywhere ‘scientists, high officials of science and education departments, ministers and political leaders are peddling an, ‘absurd, unscientific’ theory with a clear objective in mind’. **The objective is to prove that everything about modern science was discovered and put to use in ancient India. Western scientists only rediscovered and reinvented those much later. Therefore a re-writing of the history of science is necessary.**

Most of the scientists –science workers-science minded people and organizations who oppose this ‘official’ view are of the opinion that this tendentious, organized propaganda is a step in the direction to saffronize education at the behest of Sangh Parivar-RSS and the organizations run and influenced by it. On the other hand, those who support this ‘official’ doctrine contend that those who reject this are looking at the issue through colonial and western glasses. ‘The Indian Knowledge traditions have not been studied so far; people have dogmatic approach towards it and reject it without carrying out study and research.’ Anil Sahasrabuddhe [Chairman-All India Council of Technical Education].

Let’s present some of the controversial theories and claims before we start our discussion.

Ancient Indian Aviation Technology

On the eve of the 102nd Science Congress, in December 2014 during a symposium on ‘ancient science through sanskrit’ it was announced that Anand J. Bodas currently a lecturer at the Swami and his co presenter Ameya Jadhav, who claim that aircraft more advanced than today’s versions existed in ancient India, would be allowed to speak at the Indian Science Congress and present a paper on aviation in the Vedic age. No sooner than

the contents of the paper were released, the scientific community raised their voices in protest. Anyways, here is the summary of the speech delivered at the congress:

In ancient Indian literature (7000+ years ago) there are detailed descriptions of flying machines. The *Vaimanika Prakaranam* leaves no doubt that the Rishi duo-Agastya and Varadwaj built aircrafts. Modern day aircrafts can only fly from one country to another and from one continent to another, but interplanetary travel was possible with the help of ancient flying machines. Such machines could stand still in mid air and could move left, right, backwards and forward. Four different types of aircrafts have been mentioned in this scripture-for instance, *Shakuna Vimana*. It was made of Ammonium Chloride, Mercury, Borax, Mica, Silver and Panchamrita. Urine of elephants and cows was used as fuel in *Sundara Vimana*. The *Tripura Vimana* could travel across and over sky, land and water. It was also claimed that the sage Varadwaj, having discovered the presence of 24 different types of viruses in the atmosphere which infect skin, bones and the entire body, devised a special protective clothing for pilots that was virus, water and shock resistant. The then central minister for environment(education minister at present) Mr.Prakash Javadekar said, “The theories, without much tools and machines, were based on minute understanding of observations of centuries and based on experience and logic. That wisdom must be recognized.”

Having learnt about the contents of the paper before the commencement of the session, **Ramprasad Gandhiraman, a scientist at NASA’s Ames Research Centre launched an online petition demanding that this paper to be read at the Indian Science Congress in Mumbai be scrapped. Many scientists responded in solidarity. They raised objections to this effort to confuse the masses by blurring the distinction between myth and sci-**

ence.

But the issue didn't remain confined to the science congress. On 20th September 2017, the central minister of state for HRD, Satyapal Singh said he wants IIT students to learn about Pushpak Viman, a mythical flying chariot which Ravan used to abduct Sita.

Speaking at an award ceremony for engineering degree and diploma recipients he also claimed that The Wright brothers didn't invent the aeroplane. Shivakar Babuji Talpade, had flown an aircraft over the Mumbai Chaupatti in 1895, a full 8 years before the purported discovery. Incidentally, Mr Singh also said that no plant needed to be watered in the demon king Ravan's empire as they contained a mythical elixir (a magic liquid that ensures immortality) called Chandramani. Without pausing here a decision was taken to actually include this in the curriculum. In the latter half of 2018, AICTE decided to introduce a voluntary course called 'Ancient Knowledge System' for engineering students. 'Bharatiya Vidya Saar' published by Bharatiya Vidya Bhavan was recommended as the reference text for this course. In this book it has been claimed that Rishi Agastya invented Electro Voltaic cell. He prepared oxygen (O₂) and hydrogen (H₂) through electrolysis of water (H₂O). The laws of motion were discovered by Newton, but according to 'Vaisheshik Sutra' sage Kanad that discovery was made by sage Kanad. The aforementioned claims have been made on avionics. It's also been stated that the exact speed of light is mentioned in the Rigvedas. Gravitation theory was first propounded in Rigvedas.

No sooner than this came to light, Aniket Sule, a scientist from Mumbai and a faculty member of the Homi Bhabha Centre for Science Education launched a signature campaign for the petition to be sent to the AICTE chairman, Mr. Sahasabudde.

This created quite a furor among scien-

tists-science workers-students. In the petition it was written : "Making technical students aware about history of Indian science and philosophy is a laudable goal. However, we are taken aback by the news story published yesterday that AICTE has chosen to endorse the book titled Bharatiya Vidya Saar ... as a reference book for this course. The books such as these do a disservice to the goal of taking knowledge of ancient Indian sciences to students by spreading conspiracy theories and blatantly false information.' Incidentally, while responding to questions posed to him by reporters, Mr Budasa said that with the passage of time and on account of foreign rule in Indian soil, the acquired knowledge on avionics was lost and subsequently seized by the westerners.

As soon as this petition campaign was launched, Bharatiya Vidyabhavan and one of the editors of the book, Shashibala mobilized a counter petition titled : Right to know Indian Knowledge Systems. The director of Bharatiya Vidya Bhavan, Ashok Pradhan said, "These texts have always been ignored due to invasions and colonization in India". The petition states that those questioning the Bharat Vidya Saar course for engineering students are, "Haters of Indian heritage and culture." "Please do your bit and sign the counter petition to protect India's ancient knowledge. We need to answer the haters of Indian culture," it said.

In addition to presenting a paper at the Science Congress and adding it to the curriculum, it's being propagated through meetings and seminars that India was the forerunner in the field of avionics. On 9.09.2018 a seminar was convened at Dadar (Mumbai) on 'Viman Shastra'. It was widely publicized in social media. Three scientists from Bhabha Centre, including Aniket Sule went there and found that the organizers of the 'Bharatam Reawakening' were scientists themselves. Dr Prahlada Ramarao, for instance is former vice chan-

cellor of Defence Institute of Advanced Technology (DIAT) and former chief controller of DRDO. When, as members of the audience they asked the speakers where in India Mercury was mined and whether it would be possible to demonstrate if even a car can be driven using donkey urine as fuel, attempts were made to evict them from the auditorium using physical force.

Way back In 1974 Leading scientists from Indian Indian Institute of Science (IISc) (H.S.Mukunda, S.M.Deshpande, H.R.Nagendra, A.Prabhu and S.P.Govindaraju-all well versed in Sanskrit) studied the Vymanika Shastra closely. Their study paper was published in the journal SCIENTIFIC OPINION in 1974. On studying the original work in Sanskrit and its translations in Hindi-English; they arrived at the conclusion that the treatise flouts modern aerodynamics and totally violates Newtonian laws of motion. None of the planes has properties or capabilities of being flown. Apart from that the planes described were unreliable from the point of view of Geometry, building material, Chemistry and technical information.

In an interview the co-author of the scientific paper, S.M. Deshpande, a former Professor of Aerospace Engineering at the IISc told The Hindu, "When we studied the aeronautical science treatise in Sanskrit we were driven by deep scientific curiosity and never had the intention to debunk the work as pseudo science. Our research leads us to conclude that the text was written by Subbraya Shastry from Anekal-not by a Rishi Bharadwaja –and no earlier than 1904."

Therefore explanation is unnecessary. This section could be concluded with a quote from 'Pagla Dashu', Sukumar Roy's immortal creation: 'He has made a comeback!' This is so because such a claim has reappeared in the 2019 Science Congress.

Medical Science

(Plastic Surgery and other issues)

During the other session of the Mumbai Sci-

ence Congress, while commenting on plastic surgery in ancient India, Ayurvedic physician Ashwin Sawant said – "It's written in the Rig Vedas that modern surgeries were performed in 6000 BC in India. We are saying these things on the basis of facts and evidence. They used to perform cranial and eye surgeries as well as reconstructive surgery- reattaching severed body parts. They plucked damaged eyeballs, extracted dead foetus from womb and even removed live foetus from a dead mother."

"So far, Sanskrit is essentially considered a language of religion and philosophy but the fact is that it is the language of science-In ancient Sanskrit texts there are references to dissection of corpses and post mortem reports. Susruta claimed that if a corpse could be kept floating on a river for three days, it swells or bloats up and all its muscles and nerves become visible. There is a list of 20 types of sharp instruments and 101 types of blunt instruments required for surgery."

These claims, however, didn't originate in the Science Congress. In October, 2014 during his inaugural speech at the Reliance Hospital in Mumbai, Narendra Modi said, "We all read about Karna in the Mahabharata. If we think a little more, we realise that the Mahabharata says Karna was not born from his mother's womb. This means that genetic science was present at that time. There must have been some plastic surgeon at that time who got an elephant's head on the body of a human being and began the practice of plastic surgery."

A few similar claims are mentioned below :

1. Himachal Pradesh Governor Acharya Dev Vrat has said that the milk of foreign cows like Jersey and Holstein Friesian causes high blood pressure and aggression. Charya Dev Vrat, who has more than 300 cows in his 200-acre farm, also shared information about the indigenous manure, 'Jeev Amrit', using cow dung and urine. This "Amrit contributes to the proliferation of earth

worms and enhances soil fertility. Adding to his statement, he said just one desi cow can cover almost 30 acres, while 20 foreign cows like Jersey and Holstein Friesian will be required to meet the manure requirement for just one acre of the farm. Research conducted at my direction in three agricultural universities in Hisar, Kurukshetra and Naini, revealed the surprising fact that one gram of desi cow's dung contains between two lakh crore to five lakh crore fertility-boosting micro-organisms as against 60 to 70 lakh micro-organisms found in one gram of foreign cow's dung, ..." Vrat said.

2. The Uttarakhand Assembly passed a resolution declaring the cow the "rashtra mata", or mother of the nation, reported PTI. The resolution will now be forwarded to the Centre. While tabling this unanimously voted resolution Animal Husbandry Minister Rekha Arya spoke of the "medicinal qualities" of cow urine, and claimed that the cow is the "only animal that not only inhales oxygen, but also exhales it".

3. Biotechnology scientists at Junagadh Agricultural University in Gujarat have succeeded in their first attempt to kill cancer cells using cow urine. Professors Shraddha Bhatt, Rupam Singh Tomar and Research Fellow Dr. kavita Joshi have achieved this result after conducting experiments for a year. Professor Bhatt said, "This research was very risky because we directly experimented on cancer cells procured in a bottle. We administered different doses of cow urine and found the exact quantity required to kill particular numbers of cancer cells in a day. They claim that cow urine is effective in treating common cancers such as those of mouth, cervix, lungs, kidney, skin and breast. The next step is to carry out the trials on rat. Once this is successful we will prepare oral pills for different types of cancers.

Dr Tomar said, "Cancer cells multiply 10 times faster than the normal cells. In allopathy, these cells are killed using chemotherapy. But chemo-

therapy also kills healthy cells, while cow urine only attacks the infected cells and removes them from the roots." This could create confusions if the verdict of the concerned medical field is not mentioned. Venkatraman Radhakrishnan, Associate Professor Medical and Pediatric Oncology said, "No, cow urine does not prevent or cure cancers. There is no scientific evidence available to prove this. My fellow oncologists and I are yet to see a patient who exclusively consumed cow urine to be cured of cancer. Cow's urine is no different from human urine. It is predominantly comprised of water (95%), minerals like sodium, potassium, phosphorus, creatinine and epithelial cells. None of these substances have anti-cancer effects." The same arguments were forwarded at the recently concluded 106th Science Congress. There it was claimed that Gandhari gave birth to her 100 children using stem cell technology and test tube technology.

So, it's quite evident that everywhere-from ISC sessions to laboratories, schools-colleges to Loksabha- Rajyasabha, public meetings to news media- an effort is being made to present a particular narrative disguised as scientific facts, using a linear argument. We might as well borrow a line from Meghnad Saha: '**Everything is there in the Vedas**'. So it clearly follows that uncovering scientific truth or studying the legacy of science in India is not the objective of this organized campaign.

In point of fact, these efforts to establish such unsubstantiated and at times downright ludicrous arguments, with the help of unscientific means, mocks the chronicle of the steady march of science in ancient India, with respect to contemporary time.

Whatever was presented at the Mumbai Congress had no truck with time whatsoever. Susruta Samhita is a historical text which has no connection with 6000 BC. It's also a historical fact that accounts of re-attachment of severed limbs are

mentioned in ancient Egyptian texts (3000-2500 BC). Such surgeries have found mention in the Indian landmass, before they were documented in the Western world. But it sounds like the ravings of an insane person when an account of extractions of live foetuses is given from the podium of a Science Congress. Such insanity is manifested when any inconvenient, embarrassing question is branded as anti-cultural and anti-heritage. But scientific assertions require repeated substantiation. They are subjected to rigorous tests over and over again. It doesn't matter whether the proponent of the said theory might be a sage or a Newton-Einstein.

Secondly, if a technology is prevalent during a particular period, it demonstrates continuity one way or the other, in spite of temporary absence; the reason being, the replica of a technology developed on the basis of a particular theory can be replicated by others. On this Ramakrishnan's observation is pertinent: "The idea that Indian had aeroplanes 2000 years ago sounds almost essentially impossible to me. I don't believe it. The point is that if the technology was produced in a method so described that anybody could replicate it, then it becomes – Science". The other aspect or the consequence of this debate is also significant. Laying out unscientific and pseudo scientific arguments; holding onto them for dear life; abusing contrarian opinions; the authority's role as facilitators of the entire process, either directly or indirectly—all these vitiate the atmosphere. Those who oppose these views get caught in this trap and start debunking everything as false and spurious. Such views are not scientific either and serve the interests of the authorities in a roundabout way. Science demands specific analysis of specific issues.

In ancient times (for India till the beginning of 14th C) India truly touched new horizons so far as development of science is concerned and which demands a separate discussion. Former presidents of the Science Congress like Acharya Prafulla

Chandra Roy (1920), Ramnath Chopra (1948) and other scientists enhanced our knowledge regarding India's contribution in the development of science, in a scientific manner. Science-minded people and organizations should make sure that today's atmosphere of absurd claims does not generate a negative mindset towards that very scientific education.

The statement made by India's leading cosmologist professor Jayant Vishnu Narlikar on this matter is particularly relevant: "We can boast of things ... Even the west recognizes the knowledge of mathematics held by Indians. If we start making outlandish claims, the scientific community of world will not look up to us as it does now." The statement made by professor Narlikar, was made from a nationalistic perspective. Professor Ramakrishnan, on the other hand looked at the issue from a modern scientific outlook (though the context was a different one, namely the awarding of Nobel Prize) Professor Ramakrishnan said, "We are all human beings and our nationality is simply an accident by birth ... It's not about where you were born or where you come from that makes you a good scientist. What you need are good teachers, co-students, facilities ... Science are curiosity, and testing and experimenting ... Science is an international enterprise where discoveries in one part of the world are useful in other parts. Science today is a highly collaborative exercise and to convert it into a contest, as the NOBEL does, is a bad way to look at Science ... A culture based on superstitions will do worse than one based on scientific knowledge and rational thought."

Finally, it will become possible to resist the assaults of unscientific and pseudo scientific ideas on the realm of science, when the protest movements will hit the streets, overcoming the limitations of online petitions. This is the task of science-minded students and youths. A relentless effort to make the toiling masses scientifically aware is necessary to accomplish this goal. ■

Triumphs :

MOON LANDING AND CONSPIRACY THEORY

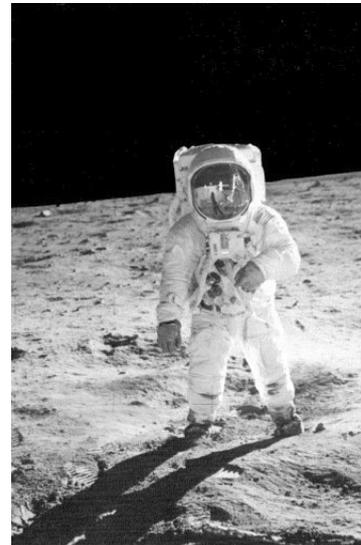
Our Universe has surprised us from time immemorial. Its infinite expansion has amazed us. The more we know, the more we are bewildered by the mystical nature of the Universe. The sky - the blue canopy over our head has become an ever expanding universe with the development of human society. Space Science has always been the most popular among people in the world of Science. Human beings, from their very childhood, are fascinated by the millions and billions of stars twinkling in the sky, and all the while in a child's mind the role of the protagonist is distinctly played by the Earth's lone satellite, our very own Moon. Our romanticism and curiosity about Moon know no bound. Innumerable stories and poems have been created on Moon. And during the course of his travel man has subconsciously built up a very special relation with the Moon.

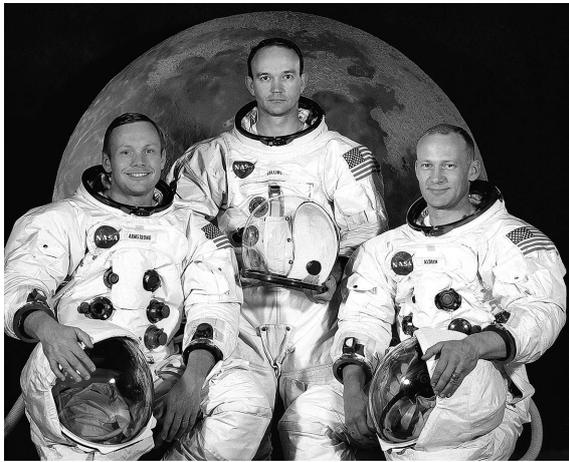
This curiosity has drawn mankind more towards the study of Moon and in consequence, we witnessed the most adventurous incident till that date, when man landed on the Moon. This invasion, which took place almost fifty years ago, has proved to be a major milestone in the evolution of the mankind. Although this incident is truly phenomenal, it has faced extreme controversies and suspicions. A lot of popular views debunk the reports as fraudulent. One such view blames American Research Centre, NASA for such duplicity. It has been said, all the photographs and videos that have been published from the time of the landing till today, are fake. These are just make-believe snapshots arranged with the help of Hollywood. This is just a trick played upon us by America to outshine the space research done by the then Socialist Russia. The aim of the NASA was just to eclipse the success of Russia and outdo their efforts. However, before we discuss the charges of conspiracy against NASA by the critics and the corresponding responses of

NASA, let us first look into the daring event of human landing on the Moon.

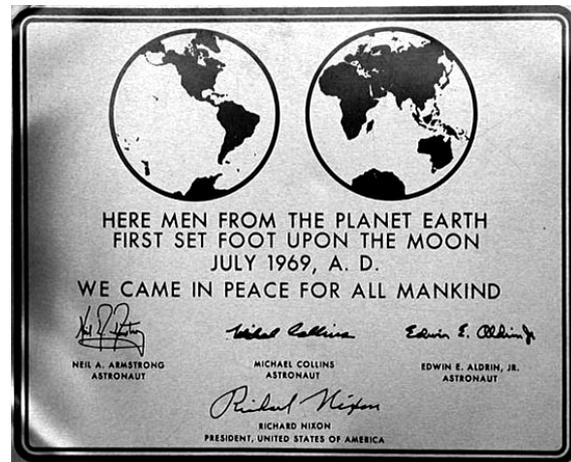
It was on 25th of May, 1961 when the then American President, John Kennedy discussed the idea

of the expedition before the American Congress. On 12th September, 1962 on the dais of the famous Rice university of Houston he publicly announced that America would be invading Moon by the end of that decade and the first person to set foot on Moon would obviously be an American. Seven years later, on 16th July 1969, American time 9:32, three designated astronauts Neil Armstrong, Buzz Aldrin and Michael Collins started their Moon landing voyage on a spaceship Apollo-11 carried by the rocket Saturn-V. After overcoming the earth's gravitational field the spaceship approached the Moon and entered the lunar orbit, set off on the Command Module 'Columbia' and separated the Lunar Module 'Eagle' from it and gradually entered the gravitation field of the Moon. Michael Collins remained in the command module and the other two astronauts Neil Armstrong and Buzz Aldrin headed towards the Moon on the Lunar Module 'Eagle'. Almost 102 hours after leaving the Earth, American time 4:17, Eagle touched the Moon's ground, on a spot known as Sea of Tranquility, which is a plateau like region built by lava. After six and a half hours of its landing, the two astronauts came out of the Eagle and set their foot on Moon. Neil Armstrong became the first human being to land on Moon. The second person was Buzz Aldrin. With





Neil Armstrong, Buzz Aldrin, Michael Collins



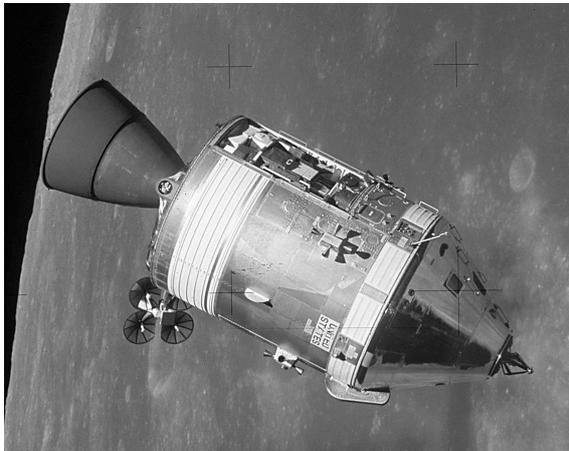
Memento left on Moon

sheer awe the entire world witnessed the first footsteps of Neil Armstrong on Moon. That one small step of man, was indeed, a giant leap for mankind. Astronauts felt that the gravity of the Moon was lesser compared to that of the Earth, almost one-sixth. They first hoisted the American Flag on the ground, collected almost 22 kgs of the soil of the Moon and clicked numerous still photos and videos for further research. All of these were preplanned. After completing these tasks, they left a memento on which was written “Here men from the planet Earth first set foot upon the Moon. July 1969, A.D. We came in peace for all mankind”.

On 21st July, American time 1:54 p.m., the lunar module flew back to attach itself with its command module where Michael Collins was awaiting the return of his co-astronauts. On 22nd of July, the module returned to the Earth's stratosphere and landed on Pacific Ocean, safely. The astronauts were kept under quarantine for eighteen days in order to disinfect them of any possible contamination.

Naturally, it begs the question : Is it a magic? It appears as if a wizard touched these two astronauts with his wand and his spells made them land on the Moon. However, this entire journey was not so smooth. It was the outcome of gigantic endeavours of scientists from time immemorial.

Let us look at the Lunar Timeline: Humanity's exploration of the Moon 1609 - Hans Lippershey discovered telescope. This marked the advent of space studies. 1610 - Scientist Galileo Galilei first observed Moon with a telescope and drew its picture with the help of Thomas Hariot. 1645 - Michael Florent van Langren made the first map of the Moon. 1751 - Giovanni Battista named the canyons on the Moon after famous philosophers and astrologers. 1753 - Roger Joseph Boscovich theoretically proved that the Moon has no atmosphere. 1957 - Soviet Russia sent its first artificial satellite Sputnik-1 to the space which could direct signals from the space. On the same year a dog 'Laika' was the first animal that was sent to space by the spaceship Sputnik-2. 1958 - American spaceship proved the existence of Van Allen radiation belt. 1959 - Luna-1 overcame the gravitational attraction of the Earth and proved the presence of solar storm. On the same year Luna-2 impacted against the Autolycus canyon on the Lunar Surface. In the same year orbiter Explorer- 6 sent snapshots of the Earth while orbiting. Luna- 3 sent pictures of the rear side of the Moon. 1961 - Nasa sent a chimpanzee named Ham to the space. Yuri Gagarin became the first man to orbit Earth in the Russian spaceship Vostok-1 1963 - Valentina Tereshkova became the first Russian woman to travel to space. 1966 - Russian spaceship Luna-9



Command Module 'Columbia'



Lunar Module 'Eagle'

landed on Moon successfully and sent thousands of pictures. 1968 - American spaceship Apollo-8 traversed Moon's orbit 10 times taking three astronauts in it. 1969 - 18 to 26 May, Apollo-10 took three astronauts to rehearse the landing on Moon, they traversed the Moon's orbit for two and a half days. On the same year, 16th July, three American astronauts started their journey to Moon in Apollo-11 and returned to Earth on 24th July after successful expedition.

Besides Apollo-11, Nasa has had six other expeditions to Moon naming Apollo 12, 13, 14, 15, 16 and 17. Among these expedition of Apollo-14 was unsuccessful. In all the expeditions, there were three astronauts, one stayed in the command module and the other two landed on Moon. So far on seven NASA-expeditions, twelve people set foot on Moon's ground. About 381.72 kgs of Moon's soil has been collected in totality for a net stay of 300 hours on Moon. The Moon's soil has been subjected to thousands of researches in various institutes worldwide and thousands of research papers have been published. The researches revealed that Lunar soil is mostly made up of Basalt which resemble the Basalt found in the ocean floor of the Earth. Other than these, rocks like Gabbro, Norite, Troctolite, anorthocite etc. are also found in the soil of the Moon. However, no hydrous minerals

e.g. Mica and Amphibole have yet been found in it.

Other than American astronauts, Russian and Chinese astronauts also set foot on Lunar soil. Recently, Chinese astronauts have landed on the other side of the Moon. NASA has declared it has plans to revisit Moon by the year 2025. Every expedition has definite goals for scientific research which in turn enrich our knowledge.

ORIGIN OF THE CONSPIRACY

The theories behind conspiracies from various quarters started to build up since 1967, when preparations for man landing on the Moon were in progress. People from several institutions were spreading this tale that it is impossible to land on Moon. Many believed that the concepts of different celestial bodies as presented in various religious scriptures are universal, and can never be defied by human being. In 1976, a retired American navy officer Bill Kaysing published a book named: 'We have never gone to the moon: America's Thirty Million Dollar swindle'. Thus, the conspiracy theory came to the forefront. Lay people were bewildered. As a result, the theory became popular. The complainants claimed that not only Apollo-11, but all the succeeding expeditions were also mere Hollywood movie shootings. After Bill Kaysing at least twenty well known personalities or organizations have

claimed these incidents to be spurious. They published books, made films and documentaries, have tried to prove their claims through the television documentaries. Some of them are listed below :

1. Marcus Allen- Publisher of the British journal *Nexas*
2. William Brian- Nuclear Physicist
3. James Collier- American Journalist and writer
4. David Parsi- Television Producer
5. Aron Ranen- Film director and producer
6. Bart Sibrel- Filmmaker of Fox Television organization

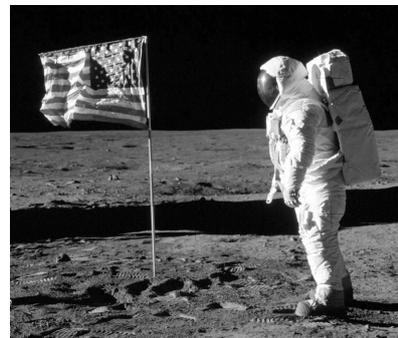
Bart Sibrel and his organization made a number of films in order to establish this theory. Few of them are: *A funny thing happened on the way to the Moon* (2001), *Conspiracy Theory : Did we land on the moon?* (2002)

However, the professional or academic profile of the complainants clearly depicts that none of them is related to Space Science, anyhow. No Space scientist or researcher anywhere in the world has claimed the account of the incident to be distorted. Even Russian Space scientists have not raised any suspicions about the entire affair. The protagonists of the conspiracy theory were primarily skeptical about the photographs and videos taken mostly during the Apollo-11 expedition. However, scientists of NASA have authoritatively responded to the complaints. Let us ponder on the primary charges posed by the complainants and the explanations that NASA gave :

Charge 1: Moon has no atmosphere. So how was the American Flag quavering when the astronauts were hoisting it on the land of Moon? Did they forget to switch off the fans while shooting?

Answer : Indeed, Moon has no atmosphere. Due to that, the American Flag was made in such a way that the Flag could be visible in the video. The Flag was suspended from a frame which was shaped like an inverted L. (illustration) The fabric was spun with fine metal wires so that the Flag didn't crumble in a place that had no atmosphere. People can misinterpret the Flag to be quavering from the video. However, the Flag was kept in a long canister, and

while taking it out, it quavered a little. A closer look would reveal that after hoisting, the Flag remained stable.



Charge

2 : We saw in the video that while the astronauts were walking on the floor of the Moon, dust was blowing. If there is no atmosphere on Moon, how could the dust blow?

Answer : Yes, the video showed blowing of dust. But, if observed carefully, the impact of the feet of the astronauts on Moon ground, made the dust move a little bit and it spontaneously settled on the ground due to the gravity of the Moon, unlike in Earth, where dust particles remain suspended in the air for a long time.

Charge 3 : The photograph depicted the Lunar Module as a broken toy, just like the coloured props usually shown in the Hollywood movies. Isn't it enough to prove that the entire shooting was a hoax?

Answer : Whatsoever the Lunar Module appeared from above, it had been specially crafted. It was a multilayered structure. Different layers were constructed of different types of insulating materials like kapton or mylar films. This was done to protect the astronauts from strong solar radiations.

Charge 4 : We all know that Neil Armstrong was the first person to land on Moon. So, who took that photograph?

Answer : The question is really funny. So is the answer. Actually, a lot of automatic cameras were installed throughout the outer surface of the Lunar Module. The pictures published by Nasa were mostly clicked by these cameras.

Charge 5 : There is a region outside the atmosphere of the Earth, which is known as Van Allen

belt. The radiation is so high in that region that any substance exposed to it faces severe damage. Then, how did the astronauts return safely?

Answer : It is true that the Earth is surrounded by Van Allen radiation belt, which is very harmful for living organisms. The belt is made up of high frequency electromagnetic radiation, as a result of which, the belt is so dangerous. However, the effect of this radiation is profound at certain regions and comparatively weaker in some. Scientists identified the weak regions much earlier and astronauts traversed that region within thirty minutes using efficient technologies.

Charge 6 : The video published by Nasa showed that the astronauts were moving very slowly. Is it a shooting done in slow motion in order to show the lower gravity in Moon.

Answer : Many technologists have tried to prove this. To show a slow motion video in any high resolution camera is just a cakewalk. But, till now, no one has succeeded to mimic the behaviour of the

dust particles of the Moon as seen in the videos published by NASA during the Moon landing.

Charge 7 : No stars were seen on the Moon's sky in the snapshots published by Nasa. Moon has no atmosphere, then judging by that, Moon's sky should have billions of stars.

Answer : The complainants did not know that the Lunar Module landed on that part of the Moon, where there was daylight. As a matter of fact, no stars were seen, just like it would be on Earth. It would have been possible to see the stars if they had landed on the other side of the Moon where it was night. But, they saw the Earth from the side which is nearer to it and hence appeared big.

Anyway, thousands of rumors were heard about Man's landing on Moon, all which has been refuted by the Scientists of NASA. Currently, the landing spots have been well identified by third party evidence. Recently, European and Japanese Space Research Centers have pointed out the instances of the landings. ■

Landing of Chang-4 on the other side of the moon

On 3rd January, 2019, Beijing Local Time 10.30 am, Chinese robotic spaceship chang-4 made a soft landing on the other side of the Lunar surface. It happened for the first time in the history of mankind. Earlier in the year of 1959 Russian spaceship Luna-3 took snaps of the other side while orbiting the Moon. Though the rear side of the moon is sometimes called as the 'dark side', literally it is not true. Actually both front as well as the back side receives sunlight uniformly. As we know that from the Earth only one side of the Moon can be seen and the other side of it always remains afar. This is due to the fact that the Moon is tidally locked to the Earth because it rotates in exactly the same time as it takes to orbit the Earth. That is why only one side of the Moon is seen from the Earth. From the Earth 59% of the Moon can be seen and the other 41% of it always remains to the back side. Therefore, maxi-

mum 59% of the lighted portion of the Moon can be seen which happens in full-moon. This portion changes due to waxing and waning during Lunar cycle. It's needless to say that in a new-moon no lighted portion can be seen from the Earth.

Though initially scientists were interested about the visible portion of the Moon, gradually their attention was drawn towards the far side. On 7th December, 2018, Chang-4 set off its journey for the Moon, reached close to it, orbited the Moon and gradually approached to the surface. On 3rd, January, 2019 made a soft landing. (picture in the cover page) But it was not possible to send signals directly from the far side to the Earth, which was known to the scientists. So they used an artificial satellite which was previously placed in a suitable location in the space, for communication with the Earth.

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Obituary :

Stephen William Hawking

The Champion of determination

– J. Chakraborty

14th March 2018, just one year ago we lost one of the greatest scientific minds of our time – Professor Stephen Hawking. Perhaps the most eligible person to write his obituary, Roger Penrose asserted,



“The image of Stephen Hawking, who died aged 76 - in his motorized wheelchair, with head contorted slightly to one side and hand crossed over to work the controls, and caught the public imagination, as a true symbol of triumph of mind over matter. As with the Delphic oracle of ancient Greece, physical impairment seemed compensated by almost supernatural gifts, which allowed his mind to roam the universe freely, upon occasion enigmatically revealing some of its secrets hidden from ordinary mortal view.

Of course, such a romanticized image can represent but a partial truth. Those who knew Hawking would clearly appreciate the dominating presence of a real human being, with an enormous zest for life, great humor and tremendous determination, yet with normal human weaknesses, as well as his more obvious strengths. It seems clear that he took great delight in his commonly perceived role as “the number one celebrity scientist”, huge audiences would attend his public lectures perhaps not always just for scientific edification.

The scientific community might well form a more sober assessment. He was extremely highly regarded, in view of his many greatly impressive, sometimes revolutionary, contributions to the understanding of the physics and the geometry of the universe.”

Professor Hawking was born on 8th January 1942 in Oxford, England. Frank, Stephen’s father was a doctor with expertise in tropical diseases;

mother Isobel had a great influence on young Stephen, thanks to her wide ranging intellect. He won a scholarship and studied physics at university college, Oxford after completion of his school life at St. Albans school. In 1962,

Stephen obtained a first class degree, which, though noteworthy, was not an outstanding one. He decided to join in the department of “Applied Mathematics and theoretical physics at Cambridge University.” By this time he became aware of some uncanny weakness regarding body movement. Soon his father noticed the defect, a tendency of falling down. Stephen was taken to hospital and it was diagnosed that he was suffering from an incurable disease, namely ALS (Amyotrophic Lateral Sclerosis) - commonly known as degenerative motor neuron disease. What causes this disease? Till date science hasn’t been able to discover it. Our nervous system consists of the central part the brain and the spinal cord - which is projected and protected within the spine. Our limbs are controlled by it. At first the impulses in our limbs are sent to spinal cord, in turn it’s transferred to brain. The nerve cells which control the movements are called motor neurons. In case of motor neuron disease the motor neurons become inactive slowly but surely. As a result the muscles of the limbs cease functioning - not all on a sudden but one by one. The paralytic condition of the concerned portion aggravates till the motor neurons become totally non functional. Stephen Hawking, in his early twenties was confronted with the fact that the disease would deprive him of his ability to walk, to speak and to write – gradually ravaging his body while leaving his mind intact. Actually by 1969, Stephen

William Hawking, the champion of determination, had become totally confined to the wheelchair.

Generally a person diagnosed with such a non curable disease initially responds with total denial and disbelief: ‘why the hell with me? But when the disease establishes its existence with facts and figures - beyond any doubt - the patient becomes a victim of deep depression, waiting resignedly for the inevitable with broken mind and body. Hawking wrote about this in his memoir. “At the time I thought my life was over and that I would never realize the potential I felt I had. But while I was in the hospital, I had seen a boy die of leukemia in the bed opposite me, and it had not been a pretty sight ... clearly there were people who were worse off than me - at least my condition didn’t make me feel sick, whenever I feel inclined to be sorry for myself, I remember that boy ... Shortly after I came out of the hospital, I dreamed that I was going to be executed. I suddenly realized that there were a lot of worthwhile things I could do if I was reprieved.” So he drew strength within himself which translated **impediment into inspiration**. He transformed the feeling of limited time into inspiration. One can understand how monumental the determination of a person - whom the doctors had given no more than two to three years of life in 1964 - was when we take into account the fact that he earned his PhD from University of Cambridge two years later precisely on 15th March 1966. Hawking’s PhD thesis, titled “Properties of Expanding Universes” under the guidance of Dennis Sciama, an outstanding figure in cosmology of his time, launched the career of a young scientist which finally reached its peak when he was acknowledged as the most influential theoretical physicist of his generation. His 134 page PhD thesis, contained a signature, probably one of the last times when Hawking was able to sign his name, in already fragile handwriting. Hawking lost pen and paper but developed a superior memory for complex mathematics and long equations. Kip Thorne, one of the long term friends

recalled “As he lost use of his hands and could no longer write equations, he developed, for better than anybody else has in history, an ability to use geometrical and topological images in his head to solve problems. That enabled him to see things that other people didn’t see. It proved crucial to a lot of his discoveries.

If we try to assess his contributions in an infinitesimally small domain of ‘immense density’ - we must say he was one of the first to combine the theory of the very large, Einstein’s general relativity, with the theory of the very small, quantum physics, the behaviour of black holes and the basic laws of thermo dynamics. ‘Large scale structure of space and time’ (1973), Black hole explosion (1974) and other great research papers were published after 1969. In opposition to contemporary perception he asserted that a black hole irradiated a form of thermal radiation, later termed ‘Hawking Radiation’. Any one of these contributions would alone secure his position as one of the most influential physicists. What made him truly great were the circumstances in which those contributions had been made, against all odds. As professor Hawking was confined to the wheel chair with diminishing ability to write, assistants who were able to understand his feeble voice and pronunciation took dictations. But his journey through the unfathomable cosmos wasn’t restrained. In 1985 in Switzerland he contracted pneumonia and a tracheotomy was necessary. He lost his voice after that. Afterwards he was dependent on a computerized speech synthesizer. Hawking could now press a switch to select phrases, words or letters. In this way he could produce up to 15 words a minute. Hawking gradually lost the mobility of his hand and since 2005 he began to control his communication device with movements of his cheek muscles. Then he lost some of the mobility he had in his face and hands were completely immobile. His hand clicker had been replaced by infrared sensors attached to his glasses, which he would activate by moving his cheek muscle. How

fascinating the fact that the cheek muscle was the only communicating thread between the world's most brilliant mind and the material world outside! It is to be acknowledged that it was a social effort as a whole to keep professor Hawking active. Hawking was an active professor with 39 research scholars being supervised by him. He was elected Lucasian professor of mathematics at the University of Cambridge. After the publication of 'A Brief History of Time' (1988), he became increasingly involved with the popularization of science. Even this contribution outlived Hawking's life span with the latest book being published after his death – 'Brief answers to the big Questions'. Sheer determination made him the longest survivor of motor neuron disease – long and fantastic 55 years. Finally we again fall back upon Roger Penrose – "I once visited him at his house in Cambridge where I was staying the night. The house had three stories and when Stephen wanted to go to bed, he would crawl up the stairs and put himself to bed, completely determined to do it completely on his own. It took him twenty minutes but that didn't deter him. He was one of the most determined people I have ever known ... despite his terrible physical circumstances he almost always remained positive about life. He enjoyed his work, the company of other scientist, the arts ..." And the final words from Stephen W Hawking himself "However bad life may seem, there is always something you can do, and succeed at, while there's life there is hope." ■

Courtesy : 1) Samikshan (December 2018) 2) Roger Penrose 3) Joas Medeiros

"Imagine"

John Lennon

Imagine there's no Heaven
It's easy if you try
No hell below us
Above us only sky
Imagine all the people
Living for today.

Imagine there's no countries
It isn't hard to do
Nothing to kill or die for
And no religion too
Imagine all the people
Living life in peace.

You may say that I'm a dreamer
But I'm not the only one
I hope someday you'll join us
And the world will be as one.

Imagine no possessions
I wonder if you can
No need for greed or hunger
A brotherhood of man
Imagine all the people
sharing all the world.

● *Landing of Chang-4*

After successful landing in the South Pole-Aitken Basin area of the Moon, the astronauts would explore Von Karman crater, known to be the largest impact crater not only of the Moon, but one of the largest craters of our solar system. The distance from the depths to the tops of the highest surrounding peaks measures about 15 km which is almost twice the height of Mount Everest. Besides, collecting and studying lunar soils of the side, the scientists will set up a mini garden on the Moon. For this purpose they carried six live species from the Earth, including cotton, potato, rapeseed, yeast and a flowering plant called Arabidopsis which may produce the first flower to grow on the Moon. ■

Special Article :

Religion-Society and Science

On the evolutionary journey from *Homo habilis* to *Homo sapiens sapiens*, while struggling against nature, man has become a social creature. Gradually human life has become society-dependent, rather than nature-dependent. Social labour and social experience have caused development of technology much earlier than emergence of science during the course of human struggle against nature. For example, construction of boats and their use started much earlier than the discovery of the principle of buoyancy. Use of Rods and axles started much earlier than the discovery of the mathematical principle of the mechanical advantage of lever. In the prehistoric age itself the compulsion to formulate rules and customs for social living within limited resources on one hand and the emergence of fear as a consequence of ignorance of nature's law gave rise to fantasies and delusions in the human consciousness.

Pre-historic Age :

The actual research on nearly 60 thousand years old human society was initiated only in the nineteenth century. The most notable researchers were Bachofen of Switzerland, McLennan of Scotland and American ethnologist and anthropologist Luis Henrie Morgan. We get an idea of the pre-historic human society from the results of their researches. Future researches will further enrich this knowledge. According to the ethnologists and anthropologists, man lived a life similar to that of wild animals at their original homeland in the beginning of the pre-historic age and was entirely dependent on nature. Afterwards, goaded by the urge of survival they spread towards the courses of rivers and along the sea coast in search of food. To meet the need for food, as also, to use in inter-species struggle, they made weapons, to which they went on making improvements. They also learnt rearing of cattle and cultivation of land. Invention of agriculture only brought to



an end to the migratory life of the primitive men. Permanent localities were being formed mainly on the banks of rivers and on the coastal regions. Morgan has shown that the different branches of Iroquoian phylum were denoted by the name of different animals. Each clan of primitive men used to accept a specific plant or animal as 'Totem'. The Totem-recognized animal would not be eaten up by the respective clan. They would rather desire their multiplication. This restriction was the 'Taboo' of that clan. Totem of each individual clan

was different from each other. By the imposition of Taboo-restriction the possibilities of different plants and animals from going extinct was preempted. The practical implementation of the "beneficent laws of society", which is actually the dictionary meaning of religion, probably originated in this way. During this age, a clan based human society was formed only to survive by struggling against nature. In this society there was no class-difference since there was no conception of individual properties. Since there was no certainty of paternity in such primitive communistic society, it was a matriarchal society. In the beginning, separate clans were formed with mother's blood-related people. In society women commanded greatest respect because of their being the progenitrix of the next generation. They used to collect food jointly and also used to consume it communally. In a society where metals had been discovered, where threads were being spun and clothes woven, the production of articles through individual labour was introduced. Blacksmiths and weavers used to produce by means of their personal labour. Gradually the groups attached with rearing of cattle and with agriculture, were separated from other groups. There was massive division of labour in society. It was possible due to excessive cattle and surplus agricultural products. There started exchange

of goods among different groups of people. Such social division of labour and exchange of surplus goods gave rise to supremacy of man over women at home and abroad and patriarchal society superseded matriarchy. Most probably it was after the development of agriculture, families of the patriarchal clans came into existence.

The laws of nature were yet unknown to them though they had started building habitations and clothes using their empirical knowledge to defend themselves from Nature's adversities. The extent of development of human brain and tools prepared by them in that age was not enough to lead them to discover the laws of nature. Primitive men were very helpless at the sudden darkening of the sky or snuffing out of daylight all of a sudden, uprooting of trees by storms, flashes of lightning, roar of thunder, perplexed by incessant rain, terror-stricken by forest fires, helpless in the face of snow-fall and flood. Birth and death were amazing phenomena to them. Sex life of women (menstruation, carrying babies in womb and delivery of child etc.) appeared a mystery to the people. An imaginary solution to such mysterious and unsolved events gave rise to the idea of a supernatural power. The hindrance on the way of unfolding of knowledge on nature was that the chief of the clan or the leaders would implant the supernatural idea in the minds of men that the visible world in space i.e. the heaven was the original abode of men. This supernatural power was the controller and the all powerful. Therefore it was their duty to worship that power as God. It was their idea that the secrets of nature and cause of all evils were the result of activities and angers of specific Gods for specific natural forces. In all countries images and idols of separate Gods and Goddesses for separate natural forces were formed. But the facial features and body structures of Gods and Goddesses of different mutually isolated countries resembled the physical features of the citizens of the corresponding countries. This regional imagination was the basic proof that thoughts originate from objects. So as to please the Gods and Goddesses, their worship, adoration and prayer before the fancied idols were started. As a means of fulfilling the self-interests by pleasing the so called supernatural powers (Gods & Goddesses), magic originated as an incantatory (of Mantras) power of the so called spiritual saints. Magic is an old practice which has been

utilized for incorporating faith on supernatural powers, powers that only can cause absolutely astonishing things to happen. And it all happens due to the will of God. Cave scientists of France Henri Edouard Breuil having studied the religions of aborigines and Alexander Marcosh having studied cave painting evidence of magic practices of aborigines, found many similarities between folk religions and magic practices of ancient and contemporary tribes. At present different religious practices and magic practices are observed amongst the different tribes of several countries. In fact, present tribal societies are carrying the testament of human civilization of prehistoric age. These can rather be termed as the 'living fossils' of pre-historic age. In the primitive age all these activities germinated the seeds of religion amongst peoples of various countries. Social manners and customs were being administered by the religious prescriptions offered by saints and sages. In maintaining life, the indispensability of nature's gifts on agricultural production i.e. the land, sunlight and rainfall etc. has made the worship of the gods of the land, the sun, the fire and the rain inevitable everywhere. The religions of primitive clans were mainly regional.

During the phase of evolution from wild state to so-called civilized society, parallel to the population growth, the clans were divided into new and smaller clans or sub-clans. From polygamous families, monogamous families were evolved. There were fights between the clans over possession of land and forest. Improvement in the tools for labour has naturally caused division of labour in the society. The duties of men were collection of food and going into war. The duties of women were household management and preparation of food and clothes. Due to such division of labour, the proprietary rights were also separate. The ownership of animal property, agricultural crops, war weapons and war-prisoner slaves went to the men folk. The ownership of household goods and utensils went to the females. The properties which were jointly made and used like house, garden, boat etc. had common ownership.

The handicraft items established the foundation of personal properties, just as, the weapons of self-defence created the embryo of personal properties. The land being converted to personal property, the personal produce started getting importance. To meet

the demand for extra labour force due to increase in personal produce, the war-prisoners were being utilized as slaves rather than being killed. The society was thus divided into classes like the ruler and the ruled, that is, the master and the slave. The state was formed.

During the mythological age the deities were powerful. But their power was confined to a specific type of job. Each deity was the God of a particular clan. As a result, the worshippers of specific deity were divided into specific clan. Some were worshippers of fire, some were of the moon and again some were worshippers of the sun. Later on, these worshippers would introduce themselves as descendants of those deities. Accounts of ancient solar race or lunar race of kings are heard everywhere in the world. For example, in the history of many countries like India, Peru of America or Sumeru (the North Pole) there is mention of solar race of kings. About 1000 years ago from today, the refugees who took shelter at Gujarat crossing the sea due to arrival of Islam in Iran, were the worshippers of Agni (the fire) founded by Zoroaster. We call their descendants the Parsis. To ensure coordination and agreement amongst the innumerable deities, the idea of an omnipotent God appeared in the human brain. This is because two Gods cannot be all-powerful at the same place and time. Also, however powerful the gods might be they would ultimately perish in due course. The logic behind this is anything which has an origin, must also have an end i.e. destruction. Only the one who doesn't have an origin and is infinite can exist eternally and would be immortal. Immortality and infinity can only exist together within a single entity. At last in human brain there appeared the idea of monotheism. Among the deities the one who is all-powerful must be endless, infinite, having no shape. He is formless. It has taken a long time for the evolution of the conception of God from a finite concrete one to a formless one, A close study of Hindu philosophy and Hindu mythology reveals that 'Brahma' is somewhere mentioned as formless and elsewhere attains a visible form. In Buddhism, there was no idolatry in Hinayana or Theravada Buddhism; it started in Mahayana. Among Jains, the Terapanthys of Swetambars and Samaiyas of Digambars have completely given up idolatry. After Christianity and Mahommedanism were introduced, monotheism and formless theism became prevalent al-

most everywhere in the world. In point of fact, in the history of evolution of man, God has assumed a formless figure in the phase at which the inception of abstract idea was most likely to have happened in the human brain.

The Historic period

The Historic period of civilization, which has a written history is the history of class divided society. According to the order of social development although the class divided slave community evolved from primitive communistic society, it did not spread around the world simultaneously and to the same extent. It did not come to an end simultaneously. The slave owning system dominated from 1000 B.C. to 400 B.C. Again, while in the womb of old social system, the embryo of the new social system is created, the manners and customs of old social system, in turn, linger for a long time within the new social system. For example, in America, during the presidency of Abraham Lincoln (who himself desired an end to the slavery system), John Brown was hanged by the Virginia court after being declared a rebel for his attempt to eradicate the slavery system. During the age of slavery Hinduism, Buddhism, Jainism in India, Jewish and Christianity in the Middle East came into being. During the era of slavery Islam also originated in Arab and during the feudal age Sikh religion originated in India. Discussion in detail about these religions is not consistent with the present subject matter. But a few relevant points are being touched on: **In Slave society**

(a) On Hindu Religion :

According to historical information there was no existence of a religion called 'Hindu' in the Indian sub continent. Earlier there was this notion that about 3500 years ago the civilization and culture established by the Aryans at the Indus Valley after crossing the Hindukush was the Hindu religion. In the beginning, this religion was founded upon the worship of nature. But since 1922 as a result of uncovering of 'Harappa' & 'Mohenjodaro' through phased Archeological excavations, modern historians have accepted the Indian Philosophy of pre-Aryan Indus civilization age as Ancient Indian Philosophy. From the statement published in 1939 A.D. by John Marshal who was responsible for the undertaking of excavation work at Mahenjodaro till 1927 A.D. on behalf of Indian Archaeological Department, it was established that those who composed

the Vedas did not build Indus Civilization. But the interpretation of the script of Indus civilization is yet to be made possible. If it were possible, then answers to many unsolved questions regarding this civilization could be obtained. By dint of consistent archaeological work it was ascertained that the Vedic Aryans had no script when they arrived in this country. Perhaps due to this reason the Vedas was 'Shruti' (passed on from Guru to disciples through oral communication) in the initial stage. On analyzing the information of Vedic and Pre-Vedic age, it is presumed that during Indus civilization the religious faith was matriarchal and conversely, during Vedic civilization religious faith was patriarchal. Out of the efficacious desires of the earth or of nature, the imagination of Basumata (the earth) of Adyashakti (the primordial energy) of Jagadamba (the mother of the world) was originated. The source of such imagination of Basumata (i.e. the earth) lies on an ancient belief, according to which the natural and human fertility are homologous. That is why the crop-yielding nature is analogous to a breast-feeding mother. And therefore, nature is also imagined as a mother.

Therefore there is no reason to imagine Hinduism as only Vedic. Its main ingredient is Pre Aryan or Non-Aryan. Many people say that any religion that has arisen in ancient India is a Hindu religion. But on account of comparatively narrow perceptions many people call only Vedic religion as Hinduism. The first conclusion of Hinduism is the existence of God, the second is that God is omnipresent and exists everywhere. In Hinduism (1) Recurrence of attaining birth, i.e., the doctrine of rebirth is recognized, (2) Caste-system i.e. social class division is recognized, (3) According to Manu, landless and personal property less class is born only to serve the higher class, (4) In Manu's writings it is stated that Shudras are the servants of the Brahmins. They have to serve as slaves till death. If anyone is freed from slavery, he will still remain as slave. Apart from this, even if any Shudra earns money it could be confiscated by the Brahmins, because the Vedas has not accorded the right to own money to Shudras (5) Manu has not approved freedom to the women. Brahmins have attained a special position at the social structure of Hinduism.

Brahmins have been given this eternal religion an institutional form - which is known as Brahminism or better to say, Brahministic Religion. In India,

Brahminism proliferated from the Sunga to the Gupta period. During this era the two epics, the Ramayana and the Mahabharata were composed and publicized. Both these two epics deal with disputes over the right to succession of personal properties. Attempts were made to establish Rama and Krishna as divine incarnations by giving them a historic and religious form. These two epics were meant to serve two objectives: one was to present ancient India's social distribution of strata as eternal by giving it a religious coating. The other was to propagate certain domestic laws which were inseparably linked to ancient socio-economic structure, such as, the absolute supremacy and authority of husband over wife, of father over son, of elder brother over his younger. In Kautilya's Arthashastra uniting Shudras and compelling them to work without wages was stated to be legal. In Vaishnav religion pronounced by Srachaitanya and Ramanuja there is no casteism. But since it was based on Vedanta religion, Vaishnavism is counted as a branch of Hinduism.

Dr. Bhupendra Nath Dutta in his book "Indian Social System" at the chapter of "Hinduyug" has written that Brahminism has accepted the Totem faiths of many castes as Hindu religious faith. In this chapter of the book he also stated earlier, "Today the Hindu society is divided into many a caste. Through individual regulations, social manners and customs and through their priests, they are delinked from one other. For this reason it has to be stated that Hindu society is the aggregate of diverse societies. For want of a centralized socio-political rule, different assemblies of men advanced in different directions without being united under one nation. For this reason it is observed in the political field that Hindus are separated in a hundred different ways. But these high or low caste people are not at all ashamed on account of this."

B. Walker once stated about Hinduism that "Due to its omnipresent nature and tradition of continuous development, Hinduism eludes any specific definition. This is so as this religion does not highlight any specific religious faith, any hard and fast ideology or any commonly accepted rules and regulations. There is no analogous institution like the Christian church no in Hinduism. Neither is there any religious rite which is obligatory for everyone. Therefore Hinduism cannot be termed as a religion."

According to some historians the idea of the word 'Hindu' having been originated from 'Sindh' (a place) is not beyond doubt. In the book "In search of one's Hindu Identity" Dwijendra Narayan has stated – "Although in 'Veda' or 'Purana' somewhere it is mentioned, the word Hindu took a compact form during colonial ruling. Even the idea of India of Bharat assumed a close-knit structure during the middle of Nineteenth century. The word 'Hindu' is rarely seen in the devotional literatures of middle age written in regional languages. ... In these books there is no clear deliberation on the significance of the word Hindu or on the meaning of Hindu Religion ... the Saints of Middle age and the poets of Bhakti movement actually designated the followers of brahminism caste-centred ideas against whom they agitated, as Hindu.

Before the colonial age, absence of the words Hindu and Hinduism only one or two mentions in the poems of Bhakti movement, and the limited extent of their meaning indicate that the Indians had never constructed their Hindu religious identity."

Thus Hinduism is not a compact religion, it has no original founder. It has no central religious book. As a result it has no specific stand on the views of other faiths. There is simply no doctrine- neither endorsing resistance nor advocating tolerance. Actually Aryans or people of pre-aryan India were worshippers of nature as existing in pre-historic age – which was known as the eternal religion. As this eternal religion had no theological or philosophical basis, nobody was invited at the "world religious meet" at Chicago of America in the year 1893 AD representing the Indian eternal religion. At the endeavour of a group of Indian kings and emperors and armed with the identity card collected from an European Sri Narendra Nath Dutta (Swami Vivekananda) appeared at that Religious Meet and proclaimed that Upanishada, which he renamed Vedanta, was the philosophical basis of Hinduism. At present, a separate course for Hindu priests and an arrangement for awarding degree for them has been made. In fact, by virtue of Indian subcontinent being naturally fertile, 'Slave revolution' did not spread here as opposed to Europe. Yet both in Veda & Vedanta caste-system finds mention. Other than the Brahmin, Kshatriya (the warrior caste) and the Vaishya (the merchant class), the shudras didn't have the authority to practice any religious rite. From the authority of the shudras as de-

scribed in Veda and Upanishada it is clearly understood that in the original Indian society the shudras were recognized as the Dasas i.e. slaves.

b) About Charvaka philosophy : In pre-buddhist age, Charvaka philosophy or secular philosophy appeared virtually as a philosophy of the atheist who defied supernaturalism. In the treatises of the philosophers opposing them, the quotations from the Charvakas in the course of refutation of Charvaka or secular opinion are the evidences of existence of Charvaka philosophy. No book about this philosophy has been discovered so far. What is known indirectly is that – they denied the existence of Atma or the soul, God and life after death was only an imagination to them. They claimed that the Vedas do not offer proofs and Vedic sacrifice was not only meaningless but deceitful too.

c) About Buddhism :

Buddhism originated mainly as a reaction to rituals of Brahminism in Hindu Religion and its ceremonies. Buddhism does not accept the Vedas as an authority. The Buddhists have no God. Gautam was born in a Shakya tribal family in north east India about 553 B.C.. He declared himself as Buddha after acquiring thorough knowledge through deep meditation. Buddhism spread widely during the reign of emperor Ashoka in about 247 B.C.. Although Buddhism originated in India it spread widely outside India. Around 1st century AD. during the reign of emperor Kanishka after the 4th conference of the Buddhists, their association was divided in two groups as Hinayana and Mahayana. The Hinayana scriptures were written in Pali and preserved in Sri Lanka (Singhla), Burma and Siam (Thailand) The Mahayana was written in Sanskrit and preserved in Nepal, China, Japan and Tibet. Tripitaka is mainly a Hinayana scripture and is written in Pali. The Buddhists do not believe in soul beyond the body. The soul is not any static matter. Buddha gave emphasis on observance of scriptural rules by the common people, not on philosophy. So as to find the cause of misery Buddhism accepted the doctrine of Karma (selfless act). Lord Buddha used to avoid ten philosophical questions. These are – whether the world was eternal or not-eternal in origin, limited or infinite, whether the self was identical with the body..etc In Hinayana Buddhism there was no custom of worshipping multiple idols. At a later time in Mahayana Bud-

dhism, worshipping many idols was introduced. Amongst the Buddhists, worshipping highest number of idols was in vogue in Vajrayana adoration which was linked with the Tantra practices. According to Buddhists irrespective of castes and creeds everyone had the right to take sanyas i.e. the ways of an ascetic. According to Buddhism anyone who is interested in complete emancipation of his soul, is free to take to asceticism. The popularity of Buddhism grew rapidly since there was no caste system. Buddhists believe in "the story of Jatakas" which is actually a doctrine of transmigration of soul (doctrine of rebirth). In Buddhism "Trisharan" is about Buddha, Dharma (religion) and Sangha (the association) – Buddhang Smaranang gachchhami, Dharmang Smaranang Gachchhami and Sanghang Smaranang gachchhami.

D) Regarding Jainism :

The meaning of the word Jain is victory. Those who attained salvation by overcoming anger or malice are the Jains. In very ancient times, it was presumed that Rishavdev had founded this religion. Out of 24 Tirthankars (holy sage), Mahavira was the last one. He was contemporary to Buddhadev. According to Mahavira, although the body or the soul of creatures were determined by their previous lives, creatures can build their future to a much extent by dint of their own deed or action. Mahavira had not objected to women's participation in the Sangha (association) and family men were given a respectful position in the Sangha, by virtue of which the stability of the sangha was ensured. The essence of this religion is universal non-violence and non-acceptance, that is, keeping away from attachments. Therefore sacrifice is forbidden. The Jains do not believe in the Vedas or in God. According to this philosophy, everything in this world is confined within the realms of the living or animates and that of non-living or inanimate. As per this doctrine the soul cannot be possessed, but can be perceived from the traits of real objects. Creatures, after attaining complete emancipation are freed from the cycle of birth and death. According to Jainism, to explain the origin and existence of the Universe there is no need to conceive a creation theory or of a creator. In course of time the Jains were divided into two sects, namely, the Svetambar (wearing white cloths) and the Digambar (the undressed i.e. naked). Much after this, the Terapanthis among the Svetambars and the Samaiyas

among the Digambars totally stopped worshipping idols.

Ancient India

According to Cherbatsky, just before the emergence of Buddhism during 6th or 5th century B.C., there were a variety of ideologies prevalent in India. This age was almost contemporary to the age of cultivation of philosophy in ancient China and ancient Greece. The aim of Indian philosophy was not analysis or examination. The reason behind adopting this philosophical viewpoint was: philosophy in India, unlike in the West, did not originate out of awe curiosity about the mysteries of Nature and life. On the contrary, Indian philosophy originated from the real need of overcoming the ethical and day to day world-weariness. As a result, the task of liberating Indian philosophy from old religious faiths and mythological imaginations remained incomplete. But in Europe, from ancient times, the distinction between philosophy and religious practice has been clear and categorical. At least historically, philosophy and religion has remained intermingled to a large extent in India. In Europe, a Greek philosopher, free from mythological imaginations, named entity, everything is born out of water. The sense in which we use the words Astik (theist) and Nastik (atheist) at present, has never been followed in Indian philosophy. In Indian philosophy Astik means a believer in the Vedas and Nastik stands for a non-believer.

In India, during the slave owning period while trade was proliferating, alliances with the princes was essential for the travelling merchants. Now the princes from different areas of India were in favour of religious practice that involved animal sacrifices. To the merchant class associated with agriculture, demand for beasts of burden was very high. But uncontrolled offering of slaughtered animals in the name of sacrifice (especially of buffaloes) was detrimental to their class interest. With increase in agricultural yield grievances against the practice of animal sacrifice became strong for purely economic reasons. The indifference of common people towards the pompous sacrificial rites observed by the wealthy people and agitation against meaningless wastage of productive power strengthened the eagerness to mobilize a cultural resistance. Under such a social situation and through Buddhism, Jainism or Ajivika religion the meaninglessness of animal slaughter and sacrificial rituals were squarely re-

jected. The necessity of Ahimsa (non-violence) as an ethical value was proclaimed. The relevance of all these changes in society was beyond question.

Buddhadeva was a king of Shakya tribes, a lower caste person in the eyes of Brahmins. Afterwards when people of higher caste accepted Buddhism, both Buddhadeva and Buddhist religion attained dignity, Emperor Ashoka, a patron of trade capital, embraced Buddhism and extended his empire by means of religious preaching .

In the Suttanipad scripture by Buddha use of common inns, pubs and bars, prostitution, usury, slavery etc. which are principal necessities of merchant class, were not condemned and were kept off the list of banned practices in civilian life. On the contrary non-payment of dues to the creditors, defaulting on interest payment etc were described as unjust. Buddhism pleaded in favour of the Vaishyas (the merchant class) who were considered as third class citizens in the Vedic age.

Without giving any importance to renunciation of worldly pleasures, and by putting special emphasis on Ahimsa (Non-violence), Mahavira had in fact preached a doctrine that served the interest of the rising merchant class. Therefore, during the days of class-alliance between the princes and Vaishyas, Jainism became as popular as Buddhism. This religion began to spread after the Mauryan emperor Chandragupta and king of Kalinga Kharkel converted to it. Even today a large number of Indian merchants are Jains.

No effort has been made to fulfill the objective of equality enshrined in Buddhist and Jain scriptures. A production system conducive to establishing equality had not appeared in that age. They didn't have the power to put an end to class society either. As opposed to that due to repeated economic reforms in society numerous variants of Buddhism and Jainism emerged – which was nothing but the expressions of economic culture of that period. Buddhism & Jainism never expressed themselves as a social movement. In Indian society the religious practices that they would observe at births or deaths or during marriages, were all as per Hindu codes. For this, the presence of Brahmins was required. As a result, although a general acceptance of Buddhism and Jainism, the Hindu rites and practices and influence of Brahmins remained unaffected. Emperor Ashoka, despite being a convert to

Buddhism, used to pay respect to the other religions of his subjects .From the accounts of Fa Hien, a Buddhist traveler who travelled through India, we get to know that the people of that age used to consider Buddhism not as an independent religion, but as a derivative of Hinduism. During 7th century A.D., from the descriptions of Hiuen-Tsang and I Tsing, the Chinese travellers travelling in India, we learn that just as in Hindu temples, the worship of Buddha idols in Buddhist monasteries began during the Gupta Age.

The inception of the foetus of the feudal system in the womb of the feudal system and the requirement of its healthy birth created conditions whereby military power would become increasingly important –which became inimical to the non-violent doctrines of Buddhism and Jainism. The political turmoil created at the time of change in the social system, caused trade to contract, and the influence of Vaishyas (merchant class) was also reduced. Under such social environment and under the influence of mythologic Brahminism the dominant role of Buddhism and Jainism in society was curbed.

e) About Christianity

Jesus Christ was born in a Jewish slave family at Bethelhem town of Palestine at a critical phase of slave-system of the Roman empire. Jesus was proclaimed as the founder of Christianity. The word Christ means saviour. Amongst the Jewish people the prediction of the advent of a savior had been prevalent. The scripture of the Christians is the Bible, which has two parts - Old Testament and New Testament. Jesus stated that abiding by the directives of the God is a greater duty than submitting to the emperor. The reason is that God's status was higher than that of the rulers of the State/ kingdom. Jesus himself proclaimed that he was a messenger of God and his mission was to fulfill God's will. But he himself was no king. Naturally, in the slave age the philosophical foundation of the king's dominance over others was under threat. Probably for this reason the slave owning class killed Jesus by crucifying him in 29 A.D.

From Engel's writing we learn that in the context of gradual development of the history of Christianity, the contribution of the research work of Bruno Bauer was the greatest. According to his research Alexandrian Jewish 'Philo' was the actual founder of Christianity and Roman Stoic 'Seneca' may be called its paternal

uncle. The stoic 'Seneca' was a religious preacher who used to preach amongst poor pensioners during the reign of Emperor Nero. In fact, Christianity emerged as the product of an amalgamation between Greek Stoic philosophy and various structurally and rationally conceived Jewish traditions i.e. - an admixture of Eastern and western ideas. It is man's inherent nature to try and attain redemption for the sins he committed. But it can only be attained by offering one's heart to god and not through offering animal sacrifices. This indispensable requirement inherent in the new religious philosophy disrupted the previous system. It sought disciples from within the poor, distressed slaves and the abandoned; while the rich and powerful people and the opportunists were treated with hatred. From that arose the religious dictum of treating worldly pleasures with contempt towards and leading an austere life. Being influenced by this philosophy recently the ex-captain of South-Africa cricket team Hansie Chronje confessed his sinful act of having got involved in a betting racket at a Church and subsequently committed suicide.

The journey of Christianity started with Philonic ideas after suitably modifying them for common people and making them acceptable to both Greeks & Romans. The instructions of New Testament started developing based on the philosophy of the stoic 'Seneca'. These teachings were about life-story of Jesus (i.e. Gospels) on the one hand, and on the other hand, concerning the Christians who originated from Jew and Pagans. After the defeat of Spartacus, the large slave population of Rome lost their confidence about their ability to make themselves free. To them the contemporary time was unbearable and future prospects were also dreadful. There was a search for a spiritual way out with the hope of finding solace within their own consciousness with a view to rid themselves of the despondencies created out of extreme poverty. Neither the idealist stoics, nor the atheist and materialist Epicureans could provide them any solace. Under this economic and political environment and amidst such intellectual and moral degradation Christianity came into being. By dint of its rejection of religions of all races (like Egyptian, Jew, Persian, Chaldean etc.) along with their rituals and customs and wholehearted acceptance of all human beings without any discrimination, Christianity, in all probability, became the first universal religion. With its new universal deity, the Jew-

ish religion was also poised to become a universal religion, but since the Jews of Israel remained an aristocratic sect, the Jewish religion could not earn that distinction.

In defence of all charges against the all pervasive materialistic and moral distresses the sin-related Christian consciousness stated - you are to blame yourself for the distortion of the world and for your internal distortions all of you are guilty. "Mea Culpa" i.e. I am the sinner. Everyone is responsible for the misfortune of all. Accepting everyone's share (of responsibility) was mandatory and that was made the precondition of spiritual salvation. The feeling that men themselves are therefore guilty of all perversities was clearly revealed by Christianity as every individual's awareness of his vices. The idea of expiation of sin with a view to pacifying the displeased God was in vogue in all old religions. In that case, the idea of a final expiation of the sinful acts done by the entire mankind through self-sacrifice of the mediator was easily acceptable. Jesus was turned into a deity who rescued mankind from sins through his self-sacrifice.

In Christianity no question has been raised anywhere regarding the slave-system. Christianity never cared for any social reform on earth. It only desired it in the next world, that is, in heaven after death. How Christianity was turned into a universal religion, was taught elaborately in the history of the Church during first three centuries of its existence. The reason was that it was the same ruling class that crucified Jesus and whose representative Nero, had Christians remorselessly killed, in an apparent somersault, declared Christianity to be the state religion through its representative Emperor Constantine in 313 AD.

Inspired by the maxim of Non-violence of Jesus the Roman slaves who had lost their confidence in their own might had started dreaming for their freedom; that very same maxim, once engaged and transformed in the hands of priests, was turned into a weapon in the hands of the ruling classes. Propagation of religion and annexation of kingdoms became complementary to one another.

F) About Islam

(The Islamic Religion): Islamic religion originated in Arabia about 1400 years ago. Prophet Hazrat Mohammed, the founder of Islam, was born in an idolater Quraysh family at Mecca city. In 622 A.D. he shifted

from Mecca to Medina where he gave shape to his religious tenet. In 630 A.D. with a view to establishing his tenet he invaded Mecca with the help of 10 thousand soldiers and after his victory he established the Islamic religion at Mecca. The Islamic religion set its rules and regulations in such a manner that was agreeable to the Arabians. On one side there were the citizens attached to trade and commerce, and on the other side were the poor Bedouins (nomads). The citizens were becoming richer, more pleasure seeking and inattentive to obeying rules and regulations. The Bedouins were poor and they were very serious about maintaining their moral integrity. So as to punish the Pagans (the Kefirs), observance of rituals and reestablishing true religious faith, as also confiscation of the properties of Pagans as compensation, they used to mobilize themselves under the leadership of a 'Mahdi'. Naturally within 100 years they attained the level of decadence of the pagans. There was necessity of purification of the tenet. There appeared a new Mahdi. The cycle began afresh. The same cycle resumed since the expedition of the Almoravid and Almohads of Africa in Spain and continued till the reign of the Mahdi of Khartoum who taught the English a lesson. At the time of mass upheaval in Persia and other Islamic countries also there was recurrence of similar phenomenon. The actual cause of such incidents was monetary. The thing was, since the successful upheavals were not followed by economic changes the situation would remain the same and the cycle would continue.

The Islamic religion appeared at such a time when rot had set in the social and cultural lives of ancient civilized countries. As a result of miserable hardships and several tyrannical oppressions, there was a deep longing among the public for a better life. Islamic religion appeared in the horizon at that juncture with the message of equality and salvation. It inspired the population with its assurance of doing away with hopelessness in the material world through economic reforms in support of mercantile capital. This new religion attracted the public who were seeking happiness in this life and peace in the next world. Islamic religion is not limited to this world and the next world only. A special feature of this religion is political Islam. It exhorted the adherents to –

1) Take up arms if necessary, proclaim Jihad (holy war) and occupy state power in order to establish

Allah's religion, 2) Send 'Dawat' to embrace Islam to other states, if they do not accept the invitation, attack them, subjugate them and establish Islamic rule and Islam there.

According to Islamic religion, Allah is one, having no origin and is the creator of all. He is the mainstay of everything. There is none who can challenge his power. Islam does not support the doctrine of incarnation. The Islamic religion is principally founded on monotheism. Islam spread through conquest of kingdoms and through conversion of the subjects of the state, as well as the war prisoners of the state. A few days after the death of Mohammed, the Muslims were divided into two sects, 'Shias' & 'Sunnis' based on the difference of opinion on right of succession and on the issue of the compilation of the Koran, the sacred book of the Muslims. There are five main pillars of Islam.

These are, Kalma, Namaz, Roja, Jakat and Haj which are obligatory duties. In Islamic religion, the cult of priesthood is debunked. But in practice, in many a case, priesthood is practiced in the guise of Imam-hood. The Islamic law of inheritance played a pioneering role in allowing women's right of succession.

Arabia was the main centre of slave-trade for Muslims. During the Khilafat age slave-trade was a very profitable business. Both black and white skinned slaves were imported in the markets of Arabia. Although Hazrat Mohammed himself made his slave Zayed free and set an example before the nation, yet he could not pass any prohibitory order against the Kings, Viziers (counselors), Amirs (rich & respectable Muslims), Sheikhs (a person initiated into Islam by Hazrat Mohammad himself) over their trade human slaves. In the beginning, among the Arabians and afterwards among the Sheikhs, Syeds, Mughals, Pathans, Turks etc. the custom of conferring Ashraf and Atraf based citizenry status was established.

The arrangement of keeping the poor class happy with the alms collected from the moneyed class was known as 'Jakat'. Therefore the Islamic religion has time and again inspired the moneyed class to contribute generously to the Jakat fund. Such an emotional hype has been created as if not only the rich but the poor and penniless have proprietary rights over the wealth of the rich as well. In fact, through Jakat there has been an endeavour to ensure the mobility of society's discriminating economy (commerce).

‘Quran Sharif’ is the religious scripture of Islam, ‘Hadish’ is the code of social conduct. ‘Ijma’ and ‘Kiyas’ are the books of law which help resolve issues in the light of Quranic precept for which Quran-Hadish have no answer. In fact, the example of changes in religious statute parallel to socio-economic changes are ‘Ijma’ & ‘Kiyas’ illustrate how religious legislation is changed in tune with socio-economic transformations.

In the fundamental doctrine of Islam there is no room for modern education. The golden era of expansion of the vast empire of Islam historically was the ‘Umayyad age’. This was further glorified by the ‘caliphs’ of ‘Akkash’ family, which surpassed all others in knowledge and wisdom and in advancement of human civilization in the contemporary world. In that age the rationalistic ‘Mu’tazila’ school of thought -which was not purely Islamic -was adopted as state tenet. The worldwide success of Islamic religion cannot be attributed to spiritual causes only. Social and political ideology also played a significant role.

During the slave system, in different countries, parallel to the inception and expansion of institutional religions, development of philosophy, science and technology continued, although at a slower pace. Since the religion would protect the interest of the ruling class, the religious institutions and the helmsmen of religion would get all out cooperation from the ruling class insofar as publicity and expansion of religion was concerned. But in many a case, the scientific research was done mainly by individuals behind the backs of the helmsmen of religion. In matters of application of scientific research and their outcome in practical life, various obstacles would come in the way, especially in the field of medical science. Yet in the field of philosophy Heraclitus, Thales, Democritus, Aristotle, Socrates, Plato appeared in Greece. There was advancement in logic and metaphysics. In Alexandria advancement in science took place; libraries and museums were founded. Invention of Geometry by Euclid, formulation of the Julian calendar and the discovery of the science of hydraulics by Archimedes were major achievements of this age. In the field of Technology Sickle, valve, gear spring, screw etc were invented. Architecture developed in Rome. Use of wind mill, water mill, rotary mill and cement began. In India zero was invented and use of ‘decimal number’ in arithmetic began. In China, Paper was invented.

In the slave system the main foundation of economy was slave labour. The main source of slaves was the war-prisoners. The soldiers of war were comprised of farmers and artisans. And from the taxes collected from them, the expense of war was met. To keep the supply of slaves running, endless battles were necessary. Naturally the population of farmers and artisans started getting wiped off. On the other hand revolt by slaves became more frequent and demand for land was raised from among the slaves. As the foundation of slave economy broke down, it became difficult to maintain slaves. The slaves and the masters of the slaves belonging to the old production system had turned into land slaves and feudatory lords in the new production system. The age of feudatory production system originated – which was known as the middle age in history.

Feudatory Society: In the countries of Western Europe, feudal age existed till 17th century in Britain and till 18th century in France. Feudal system also survived in Russia till 19th century and in India and China till 20th century. In the feudal system, the king used to distribute land to the feudatory lords under certain conditions and the feudatory lords, in turn used to distribute that land to the peasants on condition that they would pay tax in lieu of production. This was the general structure of feudatory production system. The aim of production was personal consumption. Upholding the interest of such an economy, the old institutional religions did not find any difficulty to plead in favour of the ruling classes. Annexation of other states in the interest of feudatory economies became a normal practice. The use of Institutional religions in order to seize foreign lands began.

Religious Wars or Crusades: The war between the Christians and the Muslims that continued from 1095 A.D. to 1299 A.D. was known as Crusade in history. In this war, under the disguise of proving the supremacy of religion the main object was seizure of land of the states and expansion of kingdom as well as widening of trade. Within 150 years of foundation of Islamic religion a vast land, ranging from Morocco in the west to the middle-east in the east, came under the rule of Muslim governors. In tune with the policy of Islam the citizens of those states converted to Islam. The Muslims believed that Hazrat Mohammed was the last messenger of god i.e. he was the last prophet. Not

long before that, Jesus had imparted ultimate knowledge on religion and social rules to the people of the earth. But if this is believed, then the claim for Jesus being unique and extraordinary does not hold up. Rather, Jesus becomes a carrier of an incomplete message, a message which was delivered by God in its entirety after about 600 years through Hazrat Mohammad. During the middle age in Christian society Hazrat Mihammad became the false prophet. Under this circumstance, in Europe, from 11th century till 12th century A.D. the church and the king together glorified the ethical code and mannerisms of undisciplined knights as chivalric code. The word chivalry is derived from the French word 'cheval, which means horse. Knights, who practiced chivalry, were the skillful cavalry men. Two mandatory duties of knights were proclaimed: 1) to participate in crusades 2) to devote oneself to a whole night of sleepless prayer – what is called joining in the ceremony of dubbing before being accorded knighthood.

Apart from this, through another ceremony the knights had to initiate purification of weapons for war. These matters were not implemented through legislation. Military expeditions against Muslims i.e. heathens were glorified through ballads. The poets who used to compose these Ballads and sing them at the courts of the kings or the feudatory lords, they were called 'Troubadours' in France. Mostly they were of the class of religious priests. Most of the princes, including the queen Eleanor of Aquitaine, gave the Troubadours residence in their courts. As a result, in a little while chivalry influenced the European knights who were susceptible to high ideals in building their moral characters and these knights were inspired in the doctrine of taking weapons against the heretics. This sense of morality directly paved the way for 'crusade'. While these religious wars could not consolidate the Muslim kings, in contrast, the European princes, feudatory lords, the merchant trader class and the competing Roman Catholics and Greeks – all were united in support of Christianity. The promises like absolution from sins, discharging from debts and freeing from punishment for participants in crusades united the Christian princes. In the middle age, the social uncertainty that arose out of financial stringency in Europe had, in the name of Crusade, led to a sanguinary massacre of the external Non Christian enemies.

It is learnt from the history of evolution of religious thoughts of Jews that the Jewish population had become believers of monotheism and the notion of an abstract god through many ups and downs about 1000 years ago or more. While residing in Egypt their leader Moses had saved them from tyranny. In ancient Rome the citizens had to admit that the emperor or the king was equivalent to God. Thanks to the message of non-violence propagated by Jesus, the notion of the king's equivalence to God had been dismissed. As a result, oppression on Jesus as well as his disciples began. On the basis of tenacious accusation of Jewish Priests, the justice at Rome Pontius Pilate had handed the responsibility of administering capital punishment to Jesus to his accusers i.e. the Jewish Priests, which has been used as an embryo of Anti Semitism in Christian society. In the middle age in no Christian state were the Jews granted unqualified citizenship.

Under the feudal system, during the reign of Tang dynasty in China, magnetic compass and gunpowder were invented and printing work started. In medical treatment the operation of cataract and many other improvements were observed. In Guatemala of America the Maya civilization prospered, study of Astronomy and use of zero in Arithmetic started. In Germany Universities were established for study of law, philosophy and pharmaceuticals. There was spread of rationalism. In Italy there was expansion of reason-based humanism. In England king John admitted the rights of the church and the aristocratic community and signed the great Magna Carta treaty. Sea-route to new countries and continents were discovered by Vasco-da-Gama, Columbus etc. During 15th century blast furnace was invented. Metaphysics of Aristotle was refuted by Occam and Oxford University. Nicholas Copernicus and Jonathan Keplar proved the revolution theory of stars and planets both theoretically and mathematically. Galileo invented Telescope with the help of which the orbits of stars and planets that moves round the sun were calculated. As a result of this, the theocratic theory of separate existence of heaven and the earth was proved baseless. Discoveries of Sir Isaac Newton on mechanics and gravitation and their practical application, the phenomena of the world and the universe could be linked. Blood circulation was discovered by William Harvey and dissection of dead body was done by Vesalius. Boyle discovered the relation between

volume of gas and pressure. Steam Engine was developed by Savery. Institution for scientific researches were founded at Florence and Paris. A similar institution the Royal Society was set up in England.

In the developmental stage of the feudal system the inventions of science and technology and their application raised the production to such a level which could not be controlled any further by the feudal economics. The market for commodities being expanded, the feudal lords (of England) on the one hand turned the (cultivating) lands to pasture fields after evicting the farmers from their land with the object of establishing their hegemony over commodity markets and on the other hand, the merchants started controlling the production by lending the small farmers and artisans loans as earnest money. At a later stage, these merchants started production based on wages after setting up industries and factories. The owner of the factories became the capitalists and the farmers and artisans expending labour in the factories became labourers. In respect of new relation for production there was a change in the people's consciousness. Under such social circumstances in Europe movement for religious reforms started.

Movement for Religious reform:

During the age of formation of feudal system in Europe Christianity played a constructive role. In the middle age Christian religious doctrine conferred divine blessing on the feudal society to keep the farmers under control and to resist the advancement of trade and commerce the messages of Christianity were preached. During this period the Christians were divided in to several sects like Roman Catholic, Greek orthodox, Syrian etc. These sects lived together inhabiting entire states. Within a state people of other sects were almost negligible in number. When the authority of the priests became an obstacle on the way of improvement of the businessmen then the businessmen demanded their freedom in respect of economy and condemned the wickedness, hypocrisy and luxury of the priests. In this matter they got the support of the farmers. Europe entered an age of religious mutiny. This found expression in the publicizing of other views against the views and ways of Christianity. The bourgeoisie class assumed leadership of this movement – and the farmers comprised their reserve battalions. The reformation age of Christianity existing for about 200

years was a period of cruel tyranny over the Protestants by the old Christian rulers.

In 1336 A.D. the rate of 'tithe' i.e. landlord's fee to pope being about four times than the tax payable to the kings, the parliament of England declined to pay landlord's fee to pope. Within a few years of this event Wycliffe, a professor of Oxford University, publicized that the real judge of man's conscience is god and not the pope and common law should be applied on the priests. Wycliffe got the support from the farmers and petty bourgeoisie although he was tortured by the authorities of the church. But another professor, John Huss influenced by him (Wycliffe) opposed the authority of pope at Bohemia and as a result, he was declared apostate and burnt to ashes after being tied to a post. This incident initiated a revolt against the Germans by the Czech nation. The Germans used to dominate the country's economy at that time and the important religious centres were in possession of the Germans. Amongst the rebels, there were the high bourgeoisie and the aristocracies on one side. Their centre (of activity) was at Prague and their aim was to occupy the landed properties of the church and the mines. On the other side there were the farmers, petty bourgeoisie and the labourers. At last, the leadership of these revolts were seized by democrats. The main two leaders were Martin Luther and Tomas Muentzer. But when the movement for religious reform appeared as a threat to personal properties, then apart from the German Catholics, Czech aristocratic community and the high bourgeoisie also became the enemies of the rebellion. At this time Luther joined the hostile party leaving the allies. But Tomas Muentzer raised questions about the correctness of holy books. His opinion was that the kingdom of god is not at the heaven, but it has to be created in this earth. His explanation of god's kingdom was that the entire properties of the state would be owned by common people. Immediately after this, he was arrested and killed by beheading. In fact, only after his revolt it was possible for the German bourgeoisie to advance against the feudal system. In the 16th century, there was fight between the Catholics and the Protestants in Germany. It was decided according to 'Treaty of Augsburg' that the kingly religion of a state would be the religion of the sect to which the king of that state belong. This policy is known as "Cujus regio ejus religio" in Latin.

In France, civil war between the Catholics and Protestants continued from 1562 A.D. to 1598 A.D. The Protestants of France is known as 'Huguenots'. In 1572 A.D. Henri, the Protestant Prince of Navarre, a place between France and Spain, adopted the Catholic religion only to marry a Catholic princess. Concerning this marriage in the 'Saint Barthelme' lunar-day a large number of protestant men, women and children were killed at midnight while they were on deep sleep. In 1598 A.D. king Henri brought into force the 'Edict of Nantes' based on which the protestants of France got back the right of complete citizenship. In 1610 A.D. king Henri was assassinated by a fanatic assassin.

The Tudor family in England was able to establish a paramount central monarchy with the cooperation of the bourgeoisie. As the chief of the newly formed national church king Henry the eighth disowned allegiance to pope of Rome. He closed down the Christian monasteries and all the land owned by the church came under the control of the king or was sold to the bourgeoisie after confiscating them. But he forbade translating or printing of the bible in any other language except Latin so that the authority of the priests over the preaching of religion would not be diluted. During his regime, some translators and printers and also some sellers of English bible printed at a foreign country were sentenced to death for such offence. During the short reign of 6th Edward, the son of the 8th Henry, government scriptures (prayer books) were published and mandatorily being used in all the churches. After this, at the order of his half-sister catholic Mary, three protestant bishops namely Cranmer, Latimer and Ridley were burnt to ashes. At the reign of Elizabeth, the daughter of 8th Henry, the government rules of religion were made very strict. But in spite of that the English version of bible could reach to the hands of common people. During 1573 A.D. a law was enacted in England that those who dared to disobey the government religion, would be sentenced to imprisonment or sent to exile or given capital punishment. At least, in 1611 A.D. the English translation of Bible, at the preparation by the government, was published. Those who stood on the other side of the government rules of religion they were marked as non followers of government religion. These non-followers were divided into two categories - 1) Congregational and 2) Presbyterian. In England those who ardently desired to advance

the movement for religious reforms, were called in a body as 'Puritans'.

Although movement for religious reforms played an important role with respect to the development of bourgeoisie, but since the bourgeoisie class did not appear as a ruling class as yet, the Tudors would run the government as feudatory princes. During the reign of James the first, since the amount of land revenue was reduced and expenses had gradually increased the Royal authority was compelled to increase the taxes gradually and the bourgeoisie. The bourgeoisie rejected the proposal for collecting money from them through vote in the parliament. In the field of trade and commerce the royal monopolistic power and other feudatory demands were rejected. Naturally civil war began in the guise of religious war. Understanding the situation the James the first declared that if there was no priest, there should not be any king or prince as well. As a result there was end of monarchy and at the same time the church also came under the control of parliament. In this civil war those, the diggers were one of those who were in favour of establishing true democracy. Winstanley, the leader of the Diggers stated that unless personal properties were abolished, establishment of real democracy would not be possible. He also stated that this religious ethical precepts and messages which you call matters of soul and heaven, is actually a system of thievery, with the help of which the vineyard of peace in human life can be turned upside down and which does not come through the main gate but enters through a round-about way. All these messages were actually deceptive, because when the common people gaze at the sky and remain overwhelmed by fantasies of heaven or terror of hell after death, their eyes are shut so that they remain in darkness about their birthrights and in this life, they remain blind to what they should do in this world. All these are dirty dreaminess. These are such clouds which do not cause rains. All these priests in disguise know that if they are able to keep the common people deluded in thoughts of divine perfection and glory of heaven beyond death with the spell of their divine message, then the priests themselves will be able to bring everything in this world under their possession and also will be able to enslave the deluded' .

During the reigns of Elizabeth, First James and First Charles in England, the Puritans were treated as

rebels. The civil war in England during the period 1640 A.D. to 1649 A.D. was the fight of the Puritans for possession of power. They replaced the prevalent religion with their own religious tenet by the strength of legislation. Ornamentations were removed from the churches. Government priests lost their jobs. Idols were broken. But in 1660 A.D. Charles the second again ascended the throne and the Governmental religious system was re established. The edict regarding religious system of puritans was burnt to ashes. In 1661 A.D. legislation regarding examination on religion was enacted. The gist of this law was that the person who does not worship in the church will not get any responsibility and will not be allowed to be a member of any municipality. In fact, the monarchy that was established during the reign of Charles, was different from feudal system. 2nd Charles used to rule his kingdom according to the parliament. All the subsequent rulers admitted the authority of the parliament. In 1789 A.D. it was the French Revolution which openly established for the first time in the history an atheistic state in the name of equality, fraternity and freedom. According to this revolution, religion was rejected in matters of management of the state and for the first time the goal of revolution was proclaimed in unambiguous language. During this revolution bourgeoisie killed the king 16th Louis and the Queen Marie Antoinette. That means, the earthly trial and meting out punishment to the 'king' who was, in this life, the representative of the god of the gods of supernatural world became possible. At the beheading of king on guillotine the age old idea of supernaturalism was uprooted.

At that time regeneration of capital (cycle of capital generation) in the womb of feudalism had begun in Europe. As a result, movement for religious reform, as a social reflection of conflict between old economic system and new economic system was being observed. In India, at that time Sikhism originated at the womb of feudal system.

G) About Sikhism

The founder of Sikhism was Guru Nanak. The second Guru Angada was the originator of Gurumukhi language. The third Guru Amardas established an Alms-house (a general dining hall with a view to eradicating caste-distinction. The fourth Guru Ramadas founded the town Ramdaspur Nagar (at Amritsar) and the famous Golden Temple. The fifth Sikh Guru Arjan com-

posed the "Adi Granth Sahib". He emerged as a religious Guru (a spiritual Guide) and an administrator at a time. The tenth Guru Govind Singh formed the Khalsa way of life – which was a system of military rule. Khalsa originated mainly to resist state oppression during the reign of Aurangzeb. At that time for every Sikh male person 5 'K' were mandatory. Guru Govind Singh abolished the post of a human Guru and treated 'Granth Sahib' as the Guru. Granth Sahib was the scripture of Sikhs. According to Sikh religion god is indivisible and well versed in ethics. God is not the deity of a particular person or a tribe or nation, but he is the life giver of mankind. The only way to perceive his glory is to have a keen desire to perceive. The only way to worship him is to sing the praise of God, to meditate his name. In Sikhism there is no place for caste-distinction and untouchability. Women are respected and sati-rite of Hindus was opposed. In this religion the prime duty is to render practical service to mankind through mobilizing organizational strength. In Sikhism the two important exemplary things are : 1) 'Sangat' i.e. all are equal. Everybody should earn his livelihood most honestly and through hard labour. 2) 'Pangat' or the langar, that is a common kitchen and dining hall which will remain open for everyone irrespective of caste or creed or colour. Sikh society was strengthened, through a direct armed battle against the hostile Mughal power. In the perspective of movement for Hindu religion reforms the Sikh historian Joseph Davy Cunningham commented in respect of rise of Sikhism that the Hindu mind was no longer stagnant or retrogressive ; it had been leavened with Muhammadanism, and changed and quickened for a new development, Ramanand and Gorakh had preached religious equality, and Chaitan had repeated that faith levelled caste. Kabir had denounced images and appealed to the people in their own tongue, and Vallabh had taught that effectual devotion was compatible with the ordinary duties of the world. But these good and able men appear to have been so impressed with the nothingness of this life, that they deemed the amelioration of man's social condition to be unworthy of a thought. They aimed chiefly at emancipation from priestcraft, or from the grossness of idolatry and polytheism.... They formed pious associations of contented Quietists, or they gave themselves up to the contemplation of futurity in the hope Of approaching bliss, rather than called upon their fellow creatures

to throw aside every social as well as religious trammel, and to arise a new people freed from the debasing corruption of ages. They perfected forms of dissent rather than planted the germs of nations, and their sects remain to this day as they left them. It was reserved for Nanak to perceive the true principle of reform, and to lay those broad foundations which enabled his successor Govind to fire the minds of his countrymen with new nationality, and to give practical effect to the doctrine that the lowest is equal with the highest, in race as in creed, in political rights as in religious hopes. But at the time of foundation of Sikhism there was no mention of any objective planning for ending the unendurable lives of India's major farmer class population in Sikhism.

Capitalistic Society Through the victory of bourgeoisie in French Revolution, the first capitalistic nation was established in the world. Feudatory lords and land slaves were replaced by owners of capital and wage-slaves. In other countries of Europe, the bourgeoisie class terminated the feudal system by building a nation state. The call for a separate state for the people who live for a long period in a specific land, who have the history of some economic development and who use the same language, was favourable for building a nation state. The actual object of such a call was to keep the market of commodities for a specific state, in the hands of the capitalist class of that state. The public of the state were inspired by a nationalistic feeling, which was, of course, not on the basis of any religion. Under this historical foundation of caste based nation, a Hindu state is not only a Utopia, it is also an ingredient for creating communal riot. Just before the modern age, on the one hand movement for religious reform was organized, and on the other hand fight for separating the religion from the state was initiated. By limiting the scope of religion to reverence and devotion, people were inspired to delegate in the hands of the nation all economic, political and social requirements, obligations and responsibilities. But in the new system as per economic rule, the needs of common people stood on the base of profit based supply and demand. The religious institutions were not abolished totally although were inactive. In the new society, the easiest humanistic way of getting relief from the pains of deprivation was to remain absorbed in religious philosophy as per age old habits and old conceptions. Although in practical life,

due to application of science, the effect of religion on the human consciousness had been diminished to a large extent. By increasing the elasticity of religion through refining the religious manners and customs to a large extent people were made captive in the religious philosophy in a constitutional way. In the age of unopposed competition of capitalism, the caste-based nations set up their colonies in the feudatory states. At this stage, the development of production being directly proportional to the object of production, patronization of science and scientists increased with the goal to increase production. Invention of steam-driven instruments and their use began. By virtue of gradual development of machines, the workshop created in the womb of feudalism turned into factories. Stock companies appeared. As a result of investment in industrial sectors by the stock companies, industrial revolution erupted in different countries of Europe including in England in the next phase. In subsequent stages, construction of bigger projects was taken up. There was increase in the number of joint stock companies. Production also went on increasing. But the production being more than the demand in the market, Capitalism faced the crisis of over-production. Such crisis first appeared in Britain in 1825. After this during 1847-48 the same crisis spread throughout Europe and America. The contemporary economy not having taken global shape, was only confined to certain countries or continents only. At this period, scientific outlook and progressive thoughts bloomed. In 1851 A.D. scientist Foucault exhibited a model of earth's moving round the sun. In 1859 A.D. Charles Darwin's theory of evolution, the scientific explanation for the origin of creatures and species, rendered null and void the religious supernatural theory. In 1861 Louis Pasteur rejected the theory of spontaneous creation of life and invented sterilization process. In 1867 A.D. invention of Dynamo, in 1877 A.D. Internal Combustion Engine and in 1881 A.D. invention of Diesel Engine gave a huge impetus to the industries and revolutionized the transport system. The social real image of capitalistic economy i.e. "abundance for a few and destitution for many" has created different thoughts in society. Saint Simon, and Robert Owens' justice – based Utopian communistic theories were publicized. Robert Owen founded an ideal industrial town at New Lanark, Scotland; Brook Mark established a similar industrial town

in Massachusetts, USA. Karl Marx published the theory of scientific communism. At that time the socialization of capital, labour and production started in developed countries. As a result, the symptom of carrying the embryo of socialistic society in the womb of capitalism was revealed. Under these circumstances, apart from the conflict between the capitalist class and the laboring classes, the conflict over possession of sources of raw material and capturing market or its control between capitalists became more pronounced, capitalism had entered from open competition stage to a monopolistic stage. And that was a natural spontaneous reform of capitalistic economy. At the monopolistic stage of capitalism, although there was no basic change in capitalistic economy, it took an imperialistic shape. Finance capital originated. Export of capital was introduced and its importance increased. To capture the source of raw material and to capture the market imperialistic became the norm. At this time on one hand there was world religious conference and on the other hand orthodoxy regarding religion was initiated. Following Christian orthodoxy gradually Islamic, Jewish and Hindu orthodoxy also developed. In the mean time Quantum Mechanics of Max Plank and general theory of relativity of Einstein were formulated. During the 1st imperialistic world war (1914 A.D.-1918 A.D.) the October revolution under the leadership of the working class became successful in Russia. During the 2nd imperialistic war (1939 A.D. – 1945 A.D.) labour movements were organized in East European countries including China and Vietnam. During this period, scientists were appointed to make modern weapons for war. During the 2nd imperialistic world war, in spite of not being a representative of Christian society, Hitler initiated such a disgraceful chapter of hatred towards Jews that thousands of ‘Anne Francs’ had to be buried prematurely. World famous scientist Albert Einstein was banished from Germany like many other scientists. German scientist Auto Hann stated that before handing over the Atomic Bomb to Hitler he would rather commit suicide. Scientist Einstein who took shelter in America wrote a letter to the then American president Roosevelt with the request of not using atomic energy in the war. The American government of that time gave a verbal assurance to the scientists of Manhattan project that atomic energy will only be used only in self-defence. In spite of that, due to aggressive military tactics atomic en-

ergy made its appearance in human society through the horrible atomic bomb. At that time many a scientist gave priority to the national and international emergency created by war rather than on scientific research. For example, Joliot Curie took part in the battle with a gun in hand in occupied Paris, French physicist Georges Bruhat sacrificed his life only to save his student Roussel who took part in the barrel for liberating Paris from Nazi occupation. Scientist Holweck, sacrificed his own life rather than, allow the Machine gun invented by him to be used against his favourite freedom fighters. All these incidents prove that capitalism turned into a reactionary power during imperialist period since it worked against the development of human civilization. Gradually global institutes of capital originated, and global economics was being conducted by the global institute of capital.

Keeping in mind the dreadfulness of 2nd. World war and lack of safety within industrial premises for the industrial workers and the public residing in the adjacent area of industrial workshops, anti industrial activists and environmentalists began to raise slogans. The basic theme of environmental thoughts was stable equilibrium which was against science, better to say, not a science. This is so because equilibrium of environment is dynamic. From there the anti industrial, anti scientific-experimental public opinion was built. As against chemical manure use of organic manure, against fossil-fuel use of Bio-fuel etc. – voices were raised against them. But under which economic rule would these materials be produced and distributed? Of course, it would be under the rule of capitalistic economy. Is the capitalistic economy public welfare oriented? If it were so, then for the sake of society it would bear the responsibility of maintaining environmental balance. Therefore, by hiding the rule for anti-welfare economy through use of environmentalist thoughts as a signboard, markets for different capitalistic commodities was created and side by side, erroneous ideological propaganda was initiated against ever expanding scientific ideology and scientific outlook. Yet space expedition, enhancement of knowledge about different planets, transplantation of organs in Biology, creation of a lamb named ‘Dolly’ through cloning, invention of artificial organs etc. have been made possible. Based on web servers there has been expansion of internet. Through ‘Large Hadron Collider’ of ‘CERN’ it was pos-

sible to confirm the existence of 'Higgs-Boson particle' that is responsible for 'mass' of a body. As a result of which it has become possible to disclose the mystery of creation of the universe. In spite of that to perpetuate religious belief, the Higgs-Boson particle is being publicized and been publicized as the 'God's Particle'. Side by side, the new discoveries and inventions of science are being propagated as already existing in ancient religious books and nothing new invention. All these things are vain attempts to resist the inexorable march of science and in turn, it accepts the inviolability of science.

From the last part of twentieth century a special role of religious orthodoxy is being observed. The stories that were written in the scriptures and religious texts originated during the slave system and feudal system and the ideological philosophy and the mandatory duties that were fixed, were all believed to be infallible truth that everybody should accept. Any kind of deviation to these was not possible. There was no sanctuary for those who would oppose it. The very same capitalism that came to power by rejecting religion, which brought the common people to the folds of religion by making it more elastic during the age of free competition, reverted religion back to its orthodox form during the age of Monopolies. During the beginning of twentieth century, the Protestant priests had taken a decision in a religious meet that the fundamentals of the Bible are infallible truth and these cannot be questioned. From that time Fundamentalism was born. After this fundamentalism of different religions like Islamism, Hinduism, Buddhism, Jewish etc. attained birth, and these have been propagated in different countries at the interest of monopolistic capital. In Afghanistan, to uproot the puppet Government of imperialistic Soviet Union, the American CIA at first created Al-Qaida through Saudi Arabia. After uprooting the soviet puppet government with the help of Al-Qaida, an American puppet government i.e. the Taliban government was established. Using Al-Qaida to launch armed attacks on American Embassies in different countries and on American industries, they created an opportunity to post American troops in those countries. In one of the news papers of America it was published that the air attack on White House, Pentagon and twin towers of New York on 11th September of 2001 A.D. was planned by Pentagon itself. Keeping this incident in

mind the then American president George Bush, having held Al-Qaida responsible for the above incident again declared religious war or crusade against the Muslim world. This crusade has been turned into a terrorist Jihad against criticism. Today it has been established that different capitalist groups have given birth to and rearing the religious orthodoxy and in turn, terrorism in today's world so as to fulfill their imperialistic interest. On 12th November of 2014 A.D., it was published in the Economic Times magazine that the big international banks help the terrorists.

In 2009 A.D., on protesting against publication of a satirical article against Christian community as published in Charlie Ebdoo magazine, the writer of the article was dismissed from office. But is it not tendentious and deliberate to republish a cartoon mocking Hazarat Mohammad in the name of protesting its publication? Was the present role of Charlie Ebdoo not that of the instigators of anti-Islamic new Nazi movement in Europe? For the last few years huge number of people from war devastated Middle east, or from north and west African countries have been migrating to the European countries in search of livelihood and shelter. The neo-Nazis have brought allegation against the Muslim refugees in Europe of depriving the local Christians of their livelihoods. The groups in power of the capitalistic world, during their fight for partitioning the world among themselves, have been utilizing religious orthodoxy and religious terrorists after they create them. During different social problems they hide the capitalistic origin and create communal riot.

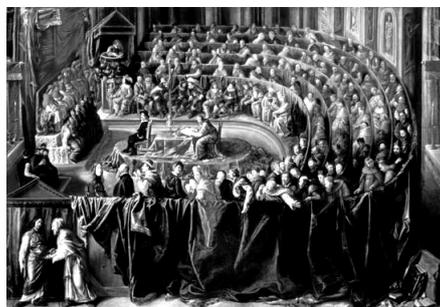
The matter to be noted here that the organizations like Al-Qaida, Jaish-e-Mohammed etc. do not have any political goal of their own. They have been created only to fulfill the political objectives of the imperialistic power. But I.S. is not any ordinary orthodox organization. It is a separate state of imperialist group which was formed with the ideal of establishing Islamic orthodoxy all over the world. In establishing this state different orthodox organizations are being utilized. The present Russian president Putin stated that a part of G20, i.e. top 20 states was backing the IS. Today every bourgeois nation is encouraging violent religious practices, or is promoting religious orthodoxy. To combat the united fight against capitalistic exploitation, the worldwide proprietor class has been re-using this opium (of religious orthodoxy).

The basic difference between Religion and Science 1) The basis for every religion is that the world is directed by a supernatural power. This power can be realized by trust or faith only, rather than by knowledge. Science is a tested materialistic knowledge. The scientific view is that the natural phenomena of the world are directed by laws of nature and the social matters are administered by social rules. Since the society is class-divided, therefore the social rules satisfy the interest of the proprietor class. But the laws of development of society are independent of individual wishes or consciousness. 2) In religion the theory of creation of the living organism and the world is mysterious. According to religious faith, the human and the animal kingdom were created at the will of and after the image of the God. But a periodic and successive investigation on history of religion will reveal that man created God out of his own imagination. In Science, the theory of creation of the organism and the world says it as a gradual development through evolution. 3) In religion everything is eternal, nothing is subject to constant change. In science, the nature, the society, everything is subject to change. This change is ever developing, dynamic and equality based – what is called doctrine of evolution. Nature's law is – the extent to which man could learn materialistic knowledge, to that extent he gains freedom to influence nature. Conclusion: Religion originated in human society as also the science. Religion and Science – both have influenced human society as well as worldly affairs in life. From historical analysis it is clear that each institutional religion appeared at unstable socio-economic junctures with a promise to liberate mankind from dependency, end dispute, and as a prop for the hopeless in the class divided society. But no religion has revealed before the public the prime cause of social unrest i.e. economic deadlock. In the pre historic age, the laws of nature not being known the supernatural world was imagined, in the doctrine of every institutional religion, the idea of supernatural world has been presented as the solution to social discrimination. As a result, in class based society, so as to increase the personal properties of the owner class, the exploiting productive relation which has given rise to the social discrimination, has been kept out of sight of the common people at the behest of institutional religions. The religion, rather, in the interest of the ruling class exist-

ing in the society or of the rising merchant class, has formed public opinion culturally either in favour of economic reforms or in favour of imposing new political economy. The conflict between two disputing ruling groups has been reflected among the common people through religion. Apart from this, different institutional religions have divided the class segregated human society in many ways. On one side it has spoiled the unity of the workers; on the other hand it has given them the opportunity to utilize the working class as pawns in the disputes of the owner class. Basically, the religion has fulfilled and, has been fulfilling the vested interest of the ruling class. For all these reasons, the institutional religion has become a strong cultural agency for upholding the interests of ruling class. Science being in opposite direction to religious philosophy, the helmsmen of religion have all along opposed the science. Philosophy originates from the instinct of judging the right or wrong instead of accepting the prevalent ideas in society without question. The persons who were engaged in such works are philosophers. The philosophers who judge right or wrong based on reasoning only, were called the rationalists and the system adopted by them was called rationalism. Contrary to that the philosophers who investigate the source of prevalent ideas so as to find the laws of nature and would come to a conclusion through different tests, were called the scientists and their conclusion were called scientific theories. As and when the self-interests of the ruling class or of the religious leaders were hampered or appeared to be hampered by scientific or philosophical doctrine, those scientists or the philosophers were arrested and killed. The death of Socrates by drinking Hemlock-poison, the death of Bruno by burning alive, the death of Galileo after having turned blind after prolonged imprisonment in darkness etc. are some of the examples of such victimization. During slave system and feudal system, in many a case the scientists used to consult among themselves in secret and in moonlight. For the reason the scientists were called the Lunatics at that time. Even after getting good result against the prevalent customs of society, if it were seen that any truth that can be revealed which may cause disbelief of religious ideas, then to keep the prevalent custom intact, the violators of custom were found guilty on trumped up charges and were sentenced to death. The glaring example of

this was the incidence of burning alive at Joan-of-arc of France. During the beginning of capitalism – the capitalistic ruling class, with the object of increasing production, patronized science and the scientists. That is why, although Darwin’s theory of evolution thoroughly rejected the religious idea about origin of species, as also of man, he was not sentenced to death. In spite of that the Church opposed his doctrine and that Darwin himself was a disbeliever of God could not be revealed before public. Again before the revolution in France for having a partnership in ‘General Firm’, a tax collecting company, the scientist like Anton Lavoisier, was guillotined by the revolutionary government in 1794. In this context the French scientist Joseph Louis La Grange commented, ‘It took them a few seconds to have him beheaded, but such a head will not come into being in another hundred years’.

Almost simultaneously with entering of capitalism into the monopolistic phase, the world religious meet and religious orthodoxy have originated. Therefore, the capitalism that has appeared by rejecting religion has made religion a part of it during the monopolistic stage. In the legislations of state, the earnings of charitable religious institution and social organizations has been made tax-free, which only looks at the interests of the capitalist group as also of the religious institutions. In many a case, the industrialists have established the religious institutions. At the monopolistic stage, the extent to which production has developed through continual application of modern science and technology, that it is poised to be upgraded to socialistic system by destroying the limitations of distribution system of capitalistic economy. And this in turn endangers the existence of capitalism. For that reason, the capitalist have attempted to check this through a lot of reforms. Under the circumstances, opportunity for restoring the lost authority of religion has opened. The leaders of religion and the capital made a joint stratagem for their mutual survival after they joined hands. Religion and capitalism, both are engaged in a symbiotic relationship. This implies, in the present socio-economic scenario, none of the capitalistic economic or institutional religion is capable of maintaining their individual existences. At present, the global economic system that has been built, is showing signs of establishing an international system after breaking the boundaries of the states. Indeed, for the



Trial of Galileo

sake of employment opportunity, for education, for medical treatment and for scientific research worldwide the educated, the semi-educated, the uneducated, the rich or the poor, irrespective of any caste and creed many people have to cross the boundary of their countries. Spontaneously the practice of not crossing the ‘Kalapani’ (going across the sea or ocean) has been rejected in society. At present, not a single state will be available where people of only one religious sect exist. The socialization that has happened on social matters cannot be obstructed by any religious doctrine of any religious sect. Under such a circumstances, is it possible to find any state in the world which will be having only one religion in that state? Or, should there exist any religion-based state? Why because, if any state is administered by any specific religion, then that will have adverse effect on the people of other religious sects which is not desirable. At present by the term a secular state we mean that state will give equal opportunity or right to every religion and will patronize every religion. In practice the similarity between a secular state and a religion-based state is that in both the cases the state dignifies the religion-based communal difference. It is needless to say that communal riots are caused in the interest of and at the instigation of the ruling class and that is not desirable for the common people. The practical experience of common people and the history are proof of that. Therefore religion is to be separated from state and should be treated as an individual matter. As per historical law of evolution of society, the development of present production and the global economy is giving an indication of an international global system for the future by going beyond nationalism. In the international global system, the sunrise of a religion of classless mankind, that is, ‘humanity’, is very near. ■

Superstitions and Science :

Science and Superstitions

Hopefully no one has the slightest doubts that that science and technology are important driving forces behind modern society. Thanks to science man, today, is exploring the cosmos, travelling from one planet to another, conducting scientific experiments deep under oceans, making very accurate weather forecasts based on observations from state of the art spacecrafts, has acquired the technology to predict and warn about natural disasters like earthquakes and has been able to double human lifespan. The infinitesimal particles within the atom are being revealed through various scientific experiments. Man has made immense advances along the road to the discovery of the origin of the Universe and life on Earth. One might say that with the help of science man has established himself as the ruler of the Earth. This vast world has shrunk into a small ball in his hand.

It's not that this development happened in a few moments through some sort of magic. It's not even the case that a mighty giant created the cities in a fit of whim, having flattened mountains. Arming himself with science, he built the edifice of civilization with his own hand; which would have been downright impossible without social labour. The onward march of the chariot of science's triumph began from the dawn of civilization. At times it has moves at a relaxed pace, sometimes it picked up speed and at certain stages it has moved in leaps and bounds. There is an intimate relationship between the development of science and societal development. An analysis of history reveals that just as scientific progress has accelerated the development of society; likewise societal progress has sped up the development of science. The development of society is a science. Hence it has been named 'social science'.

Anyways, in this age of dominance of modern science, only a handful of people are reaping its benefits. On the other hand, the vast majority of

the ordinary masses are being deprived of its boons. Ironically, as observed through the ages, their contributions in the development of science in terms of physical and mental labour have been the greatest. Their conditions are like that of those lamplighters who light up the street lamps, while their own homes are engulfed in darkness. This darkness is that of ignorance and delusion, the darkness of superstitions. Just as we are witnessing the unbridled development of market driven science and technology, conversely the consciousness of the overwhelming masses remain swamped in the condensed blackness of superstitions. This is a strange paradox. This contradiction proves that there is no connection whatsoever between the development in science and technology and the spread of science mindedness, and regarding this, the state doesn't have either any obligation or responsibility neither does it feel the need to ensure this.

Had it been so, it would surely have been reflected in the educational curricula of the state. In the present curricula science, pseudo science, and unscientific ideas coexist peacefully; and there are several instances of different conclusions being drawn on the same topic at different stages of an academic course. Today at the very moment when state representatives boastfully claim that their country has taken a pride of place in the world stage, witch hunts at the behest of *gunins* (astrologers) and *jaangurus*, faith healing by *ojhhas* (shamans), exorcisms, and attempts to dispel droughts and bring rain by arranging weddings for frogs and many other similar events are slaps on the face of such claims and give the lie to them. When outrage expressed from different quarters get out of hand, the administration fulfill their duty by arresting the guilty *ojhhas*, *gunins* and *jaangurus*. Economically backward and superstitious people then seek

other *ojhhas* and *gunins* because even if impoverished people happen to be free of superstitions, they consider it desirable to seek the help of *ojhhas* and *gunins* as it is commensurate with their economic capacity.

The state is not only unable to promote scientific consciousness, they care little about it. This state of affairs provides impetus to science minded people to commit themselves to this cause. Approximately about a hundred years ago science organizations belonging to various streams, started being formed, and they have striven to rid people of superstitions by undertaking anti superstition campaigns. Later many more science organiza-

tions were founded and this process is an ongoing one. But no one will dare to claim that superstitions have been uprooted from people's minds for the simple reason that it is impossible. As there has not been any fundamental change in the socio-economic backdrop in this country, there hasn't been any substantial change in mass consciousness. Hence we need to consider this matter deeply before drawing the conclusion that superstitious people are responsible for the persistence of superstitions and breathing a sigh of relief. Instead of that, if we keep wailing about superstitions, it would only strengthen the hold of superstitions in human consciousness. ■

Superstitious duo- ISRO and NASA

ISRO(Indian Space Research Organization) and NASA(National Aeronautical and Space Administration) are two organizations where the scientists, technologists and general staff are all steeped in spiritualism and superstitions. This fact resurfaced during the execution of ISRO's Mangalyaan project.

It was published in the media that the day and time of the launching of the ISRO built Mangalyaan along with an artificial satellite was fixed according to the list of auspicious days and hours of the Indian *panjika* or astrological calendar. Not only had that, before the launch the CEO of ISRO K Radhakrishnan gone to the Tirupati temple accompanied by his aides, to perform a puja along with offerings. A miniature replica of the satellite which would orbit Mars was placed in the offering bowl. As Christians consider the number 13 as inauspicious, ISRO enumerated the rocket launch following the 12th as 14th instead of 13th.

On 31st October,2013,in an e-mail message which was later posted in ISRO's Face book page, the scientists and technologists of NASA's jet propulsion laboratory ,having congratulated the ISRO scientists for their efforts, advised their counterparts to pass around peanuts before the launch as they had found that distribution of peanuts ensured success of the launch. Ever since their first Moon

Mission, they had been handing out peanuts whenever they launched.(vide ,Hindusthan Times 2.11,2013).

Criticizing ISRO's obsession with superstitions, senior journalist and the former director of The Statesman Print Journalism School,Kolkata, Sam Rajappa observed:

There should be no room for superstition and blind faith in an organization like ISRO. Article 51 A of the Constitution says, 'It should be the duty of every citizen of India to develop the scientific temper, humanism and the spirit of enquiry and reform. Of late, India seems to be slipping into a world of blind faith and superstition. The Oxford dictionary describes superstition as 'belief in the existence or power of the supernatural; irrational fear of unknown or mysterious. Even the new Media Centre at the Satish Dhawan Space Centre was built according to vastu shastra. Mangalyaan was launched at 14.38 hours on 5 November to avoid rahu kaalam, gulika kaalam and yamakandaka kaalam of the day, as advised by Kerala astrologers. Opening of sky windows invariably synchronises with 'auspicious' day and time. Radhakrishnan visits some of the temples in Thrissur known for black magic voodoo before any major space launch.No launch takes place from SHAR without the ISRO chairman and

his team of scientists paying obeisance to Lord Venkateswara at Tirupati, nearby Kalahasthi Temple, and the Ankammal Temple at Sulerpet and offering replicas of the spacecraft. Superstition clings to their necks as they are afraid of the number 13. After the successful launch of PSLV 12, there was no PSLV 13 because of the irrational fear.

Superstition does not permit thinking because it demands blind faith, and seldom promotes scientific temper. If ISRO were to play a significant role in space research and exploration; it should first inculcate scientific temper at least among senior staff and not succumb to mumbo jumbo and voodoo.' (Statesman 10.10.2013)

In criticizing the superstitious role of ISRO, Sam Rajappa demonstrated his loyalty to science.

Science has emerged from the endeavour to liberate natural and physiological truth from the dark stranglehold of primeval supernaturalism. The Human space exploration programme has been successful due to the discovery of several planets-stars-galaxies and calculations of their distances from the Earth (based on light years). The scholarly idiots who are in denial of this truth and repose their faith on ancient supernaturalism and astrology can neither be called scientists nor technologists.

During any interview at media centres like Akash bani or BBC, the response to any question pertaining to belief in god would invariably be: 'Science doesn't accommodate belief in god's existence'. On the other hand, in other programmes of these media centres and channels, theistic belief and belief in different religious belief systems are propagated.

Though the bourgeoisie and various institutions of its states organize scientific researches for commercial purposes and uphold the necessity of science and scientific temperament in their constitutions, they disregard science and shelter and nurture superstitious beliefs in practice. The cult of superstitions is one of the principal means of exploiting the toiling billions by keeping them swamped in the darkness of ignorance. That is why almost all the national anthems of the Bourgeois states are

hymns or songs sung in praise of god. National songs contribute in perpetuating supernaturalism and the cult of superstitions.

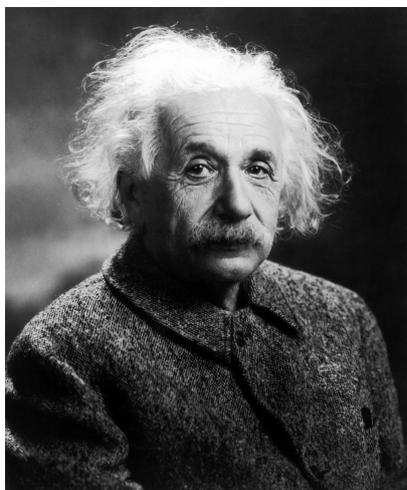
Though science debunks belief in god as blind faith or superstition, a large number of scientists believe in god in their individual capacity. But in propagating their private belief in public, they ridicule science and in doing so prove their disloyalty to science and induce people to be unfaithful to science. These people pander supernaturalism for different reasons: some are steeped in Bourgeois ideology; some are scared that they might lose patronage of the Bourgeois state, still others are committed to their sponsors or companies where they are employed.

As the influence of supernaturalism in mass consciousness gets eroded due to the increasing success of applications of science, the Bourgeois states and the purveyors of religion propagate the notion that scientists do not deny supernaturalism, using feudal-bourgeois minded scientists as their mouth-pieces.

They started painting Einstein as a Theist after his death. 'God particle' is the name of a book on Higgs –Boson particles which provide mass to the infinite particles spread around the Universe, and whose presence was detected in the light of the scientific Big Bang theory which explains the origin of the present universe. Revealingly, the author of the book 'God Particle' admitted that his editor compelled him to accept that particular title. Therefore, when the Bourgeoisie the world over exulted at the establishment of the 'proof of god's existence', after the particle's existence was verified as a result of CERN's research, they did so in order to use this discovery to retain faith in supernaturalism and rekindle faith in the minds of those who have become skeptical.

Did Einstein believe in god-theology? Most definitely he didn't.

A letter written by him and his autobiography bear testimony to this. He characterized theism as: 'most childish superstition'



‘RELIGION IS MOST CHILDISH SUPERSTITION’

In January 1954, a year before he died, in a letter to Eric Gutkind in response to the German philosopher’s book, ‘Choose Life: The Biblical Call To Revolt, Einstein wrote:

*“The word God is for me nothing more than the expression and product of human weaknesses, the Bible a collection of honorable, but still primitive legends which are nevertheless **pretty childish**. No interpretation no matter how subtle can (for me) change this. For me the Jewish religion like all other religions is an incarnation of **the most childish superstitions**. And the Jewish people to whom I gladly belong and with whose mentality I have a deep affinity have no different quality for me than all other people. As far as my experience goes, they are also no better than other human groups, although they are protected from the worst cancers by a lack of power. Otherwise I cannot see anything ‘chosen’ about them. [Emphasis by Einstein, the quote is from Professor Vasant Natrajan’s, ‘Childish Superstitions’]*

At the age of 67, Einstein writes in his autobiography :

‘... Thus I came — despite the fact that I was the son of entirely irreligious [Jewish] parents — to a deep religiosity, which, however, found an abrupt ending at the age of 12. Through the reading of popular scientific books I soon reached the conviction that much in the stories of the Bible could

not be true. The consequence was a positively fanatic [orgy of] freethinking coupled with the impression that youth is intentionally being deceived by the state through lies; it was a crushing impression. Suspicion against every kind of authority grew out of this experience, a skeptical attitude towards the convictions which were alive in any specific social environment — an attitude which has never again left me, even though later on, because of a better insight into the casual connections, it lost some of its original poignancy.

“It is quite clear to me that the religious paradise of youth, which was thus lost, was a first attempt to free myself from the chains of the “merely-personal”, from an existence which is dominated by wishes, hopes and primitive feelings. Out yonder there was this huge world, which exists independently of us human beings and which stands before us like a great, eternal riddle, at least partially accessible to our inspection and thinking. The contemplation of this world beckoned like a liberation, and I soon noticed that many a man whom I had learned to esteem and to admire had found inner freedom and security in devoted occupation with it. The mental grasp of this extra-personal world within the frame of the given possibilities swam as highest aim half consciously and half unconsciously before my mind’s eye. Similarly motivated men of the present and of the past, as well as the insights which they had achieved were the friends which could not be lost. The road to this paradise was not as comfortable and alluring as the road to the religious paradise; but it has proved itself as trustworthy, and I have never regretted having chosen it.” ■

[(Emphasis by Einstein, the quote is from Professor Vasant Natrajan’s, ‘Childish Superstitions’) His email profvasant@gmail.com - see The Hindu 30.10,2013.]

Shaligram shila and its glory

According to Hinduism Shaligram shila is the holy emblem of Lord Vishnu, who is worshipped as the protector of all life forms. 'The glory of Shaligram shila and the benefits of its worship' was the headline of an article penned by swami Vedananda and published in the 'Bartaman, weekly on 8th November.2014. In this



article, by concocting 'a delicious hodgepodge' of the sacredness of worshipping of Shaligram as a representation of lord Vishnu, and the details of its creation, he made an effort to lend a scientific basis to theology, the existence of god and Hinduism.

Today, it's impossible to take a single step forward without making use of science. People reject anything that appears unscientific. There was a time when scientists like Bruno and Galileo were subjected to horrific punishments for upholding science in the face of prevalent idealistic ideas. On one hand the lords of today's world present supernatural ideas packaged as science and accept the validity of scientific discoveries and inventions, but claim in the same breath that everything happens according to the will of god. Hence, the Pope, i.e. the supreme priest of catholic Christians, having accepted the science behind the big bang theory, said- the big bang theory explaining the birth of the Universe is correct but it happened because god wanted it to happen. The High Priests of other religions also echo the same notion. By presenting unscientific views in the guise of science they are, in point of fact, peddling the most

dangerous pseudo science. The latest example of such spurious nonsense is the article on Shaligram Shila published in the Bartaman weekly on 8th November, 2014. Come, let's try and uncover the cunning distortions in the article and arrive at a scientific analysis of it.

First let's find out what Swami

Vedananda has said on the topic:

Excerpts from the article in the Weekly

In the article Swami Vedananda wrote, "There are billions of stars in the Universe. They come into existence and pass away. Our Earth is bound to one such star, the Sun. The desire of the Jivatma(which is lodged in the bosom of this Earth) to touch the infinite expresses itself through the Shaligram Shila. In fact, determined by destiny, Shaligram Shila is the means, to touch the Infinite. The ruthless history of Mahakal (the infinite time) is written on it. It is amazing and filled with surprises. Now we will contemplate the glory of the Great Mahavishnu.

"This Shila is the emblem of Bhagawan Vishnu or Narayan. Just as the Shivling is the emblem of Shiva, likewise the Shaligram Shila represents Vishnu. In almost every Hindu household, Shaligram Shila dwells as the Kuladevata (household deity).

"Shaligram is a symbol of the idol of Vishnu. The 'Chakra' has been inscribed on it by the Vajrakeeta. The Vajrakeeta inscribed rock found in the banks of the Gandaki river is called Shaligram shila. What is Vajrakeeta? It's a tapeworm like organism.

“This organism came into existence 18 crore (180 million) years ago on sea bed. The Himalayas had not yet been born. The age of the Himalayas is a mere 3 crore years. Though these organisms attained birth in the Jurassic Age, it took them a few crore years more to become extinct and turn into rocks.

“In this mountain range that part of the slope is known as ‘Spiti Shale’. The rock containing fossils of different species of *Perisphinctes* genus which come under the Ammonite group is Shaligram Shila, which has been worshipped in Hindu households as the symbol of Narayana.

The Gandaki river comes flowing down from the Permafrost region of the Upper Himalayas which lies south of Nepal—the only Hindu state in the World. Kaligandaki rushes down from the Gandak mountain. The other name of Gandak mountain is Shaligram mountain. The petrified remains of that ancient fossil lie hidden in layer after layer of this mountain. The rock layers get eroded by the fast currents of the river. The Gandaki River is dark as the mountain side dissolves due to intense friction, and dissolves in the water. And the 18 crore year old fossils hidden in the rock layers of this black mountain are wrenched out by flowing water and are thrust into the Gandaki river. Thus the Shaligram river has been carrying the Shaligram shila from Shaligram Mountain through the ages.

“The ancient sages and experts on scriptures analyzed these stones and noticed that there are various signs resembling the conch, chakra, mace, lotus, garlands etc. of Vishnu.

“The worship of Shaligram shila brings about untold benefits to mankind. It drives away sorrow and ensures success in every enterprise. Such Shaligram shilsa exhibiting various features are worshipped in households.

“Why did Bhagwan Vishnu manifest his footmark in the form of stones? Before answering this question, let me explain—What are meant by Bhagwan Vishnu and Narayan? Vishnu is an

omnipresent entity. Whatever permeates everything, every molecule and atom is Vishnu. Vishnu is behind the expansion of the infinite Universe. He lies on his back on the sea of reason—his essence is at the focus of billions of Galaxies. Vishnu is the supreme power. It is under the influence of this supreme power that the Universe emanates, becomes stable and is destroyed. Hence Bhagwan Vishnu is the sentient presence within everything in the Universe—he exists eternally in every atom, every molecule, he is ‘Sacchidananda (the essence of Bramha or supreme being)—ageless, in spite of being the master of the six ‘Vikaras’ (distortions) i.e. birth, stability, growth, decay and destruction.

How did his boundless compassion come down raining on the earthly Gandaki River? Various Puranic stories and their significance shed light on this.

“Once Laxmi, Saraswati and Ganga got into a fight over the possession of Vishnu in his totality. The quarrel rose to such a pitch that Saraswati, forgetting herself, cursed her own sister, Laxmi—may you attain rebirth in Earth in the form of a tree. Laxmi had a soft heart and was mild-mannered. She broke into tears on being cursed. At this, the golden-hearted Vishnu wiped her tears and told her - you will come back to my bosom, once the term of your curse is over. First you will be born as a girl, and then transformed into a tree.

“In due course, Laxmidevi, cursed by Saraswati was born as, Tulsi, the daughter of king Dharmadhvaj. Later she became the wife of Shankhachur asura. Shankhachur was the scourge of Gods. Though accorded with the boon of immortality by Bramha, he was fated to die if someone violated her. When Shankhachur’s oppression made life unbearable for the gods, Narayana sent Shiva to fight with him; and he himself went to Tulsi in the guise of Shankhachur and raped her. When she came to know of this deception, the furious Tulsi cursed her husband from her previous birth—you will be born as a stone



Floated Perisphinctes in sea water (imaginary)



Fossilized Perisphinctes in shale

for this sinful and deceitful act.

“From that time onwards Narayan came to dwell on the womb of Gandaki and the leaves of Tulsi combined with the Shila came to bear testimony to immortal love.

“In various Puranas the script writers have written- Bhagwan Vishnu said- Narayan Shila bears a part of me. I am born as Narayan Shila. And whoever separates the Tulsi leaf from Narayan Shila must bear the pain of separation from his wife.’

“Today even science admits that the mark of the creator lies invisible or in subtle forms within his creations. Hence the creator can never be far away from his creations.

“In the scriptures it’s written on the eve of world creation, Bhagwan Vishnu lay on the vast sea of reason, using Anantanaga as a bed, and lapsed into yoganidra.

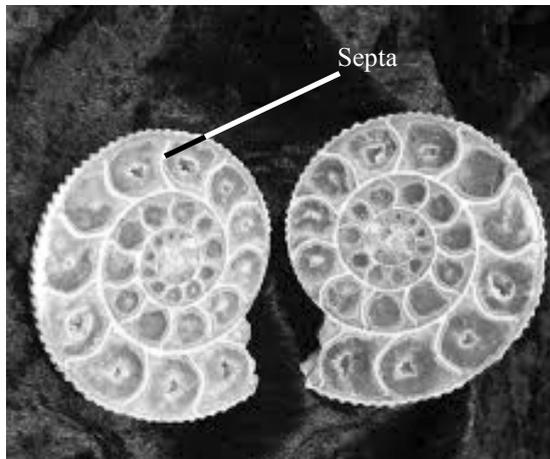
“How is water formed?” Through the combination of Hydrogen, Oxygen and electricity. Most of the world creating elementary particles before the Big Bang was Hydrogen gas, Carbon, Helium, Nitrogen etc. Omnipresent Vishnu has existed, first in the form of molecules of Hydrogen and later Oxygen. On top of that after the Big Bang, the centres and foci of all galaxies became coiled-this is the navel of Vishnu and the sea of

reason is the primeval elementary particle-the infinite pall of clouds above it was imagined as Anantnag. After that the world was created as a result of the evolution of the Universe-Vishnu’s essence pervades its oceans and their molecules and atoms.

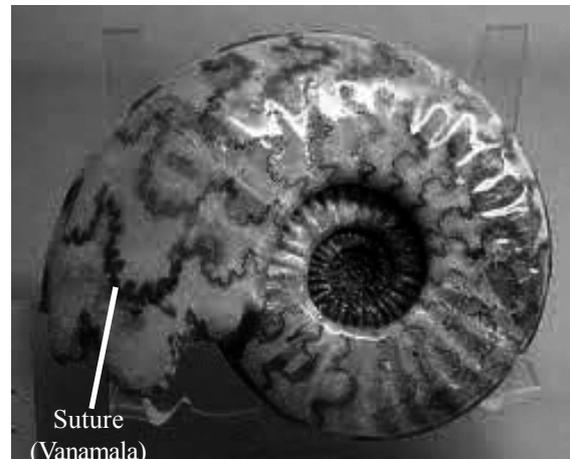
“Bhagwan Satyanarayan is fond of bananas, molasses and coarse flour.

“The devotee who worships Shaligram Shila is blessed with sons and grandsons, his house remains filled with heavenly bliss and he attains moksha after he dies.

“This garland is the coiled shells of the Perisphinctes organisms belonging to the Ammonite genus. The surfaces of these shells are beautiful and decorated. The decorated garland designs become visible when the rocky coverings of the fossils become dislodged along with the shells of these creatures. Only at that time do the garland designs are inscribed on fossilized Shilas. This garland decoration is present in all Shilas, but with some they are clearly visible and with others they remain hidden. Question is: How did the Vajrakeeta which lived in the lower depths of the ocean turns into fossils? This is a natural phenomenon. When these Vajrakeetas or tapeworm like creatures die their flesh gets decomposed and the shells eventually turn into fossils after having re-



Inner Wall of Fossil (Septa)



Ammonitic Suture (Vanamala)

mained buried under ground. First they transform into organic matter, then into inorganic substances and finally into fossils. These stony forms of organisms are fossils or Vajrakeeta fossils- which were created as Shaligram Shilas on ocean beds. Later when the Himalayas raised its head the mountainsides reared up. And it all happened before man inhabited the Earth. Therefore it's evident that the Shaligram shilas were formed at least 30 crore years before humans came on Earth.

“Apart from Gandaki, these Shaligram fossils are also found in the khasi hills of Meghalaya, in the Narmada Valley, in Pondicherry and Trichinapali (Ammonite fossils) in Southern India, but for various reasons these have not been acknowledged as Shaligram Shilas.

What exactly are Shaligram Shilas?

After reading this article, there's nothing one can do but praise it. Not ordinary people, but those who are gifted with extraordinary cunning, could cook such a delicious hodgepodge of science and theology. This is the reason why these sadhus are revered by politicians and the capitalist class i.e. the ruling class. But in his bid to appear scholarly on matters pertaining to science Swami Maharaj has made quite a few errors on account of his ignorance. Surely his Lord will forgive him for his failings! Anyway, in order to prise open the shell

of cunning and pseudo science, we need to understand the scientific explanation behind the phenomenon of this fossil called 'Shaligram Shila.

That which the proponents of Hinduism are characterizing as Shaligram Shila is, actually a kind of sea fossil-Molusca or snail like creature (Phylum- Molusca, Class- Cephalopoda). This kind of organisms (Group- Ammonoidea) became extinct from the Earth around 6 crore years ago (Cretaceous Era). Today other classes and subclasses of this snail like creatures are around. For example Nautiloidea (sub class), Octopus, Sepia etc. belonging to Coleoidea sub class. Creatures belonging to this class used to swim in the oceans, and the extant (those still in existence) ones still do the same. They possess brains which are the most developed among invertebrates. The Cephalopoda make use of their heads according to the way they move. Hence the name. The marine creatures belonging to the Cephalopoda class came into existence around 41 crore years ago (Devonian Era) in the course of evolution of life. Among these organisms belonging to the Ammonoidea sub class became extinct during the Cretaceous period. That which sages and priests worship as Shaligram Shila is a Genus called *Perisphinctes* under the Ammonoidea sub class. This Genus existed for a very short time

span(between the Callovian of the Upper Jurassic Era and the Tithonian stage). They evolved around 16.5 crore years ago and became extinct around 14.56 crore years ago. Possessing developed brains just like different species belonging to Ammonoid sub class, they were comparatively 'intelligent'. Their eyes were also developed, in comparative terms. They had a certain gland which secreted a pigment called Chromatophore with the help of which they could change the colours of their shells in order to protect themselves. This explains their multicoloured shells. These organisms were dimorphic i.e. the male and the female differed in size and shape. The male was rather small(diameter less than 1 inch for adults) while the female was much larger(diameter between 2/3" and 6/8 "). In most cases the Shaligram Shila worshipped in temples or Hindu households is the female Perisphinctes. Shaligram Shila is the fossilized form of the ammonite of the Perisphinctes group. The snails belonging to these species were carnivores. They were coiled, bilaterally symmetrical, shaped like circular discs. Their shells were made of Calcium Carbonate (Aragonite mineral), which got destroyed during fossilization. Their fossils are found as internal moulds. There are various walls or septa inside the shells and through one of its holes the siphon emerged. Through it water and food would be sucked inside. In order to be able to swim about they kept adapting themselves. Those species under the Ammonoid sub class that failed to adapt became extinct fast. Finally, at the end of the Cretaceous Era, the Ammonoids became extinct along with different marine and terrestrial organisms. These creatures roamed across the oceans all over the world, but were wiped off as they couldn't adapt themselves to changes in the environment. This is the reason why the Ammonoid sub class organisms(including Perisphinctes) are superb index fossils. Perisphinctes fossils (Shaligrami or Narayani) are found on the oceanic rocks of the Upper Jurassic Age (Callovian to Tithonian). Not

only in the Gandaki River, fossils of other species of Ammonite of the Cretaceous period are found in Kashmir, Himachal Pradesh (Spiti Basin), Ladakh, the Kachh-kathiawar region and the Jaisalmer deserts of Rajasthan. Other Ammonite fossils belonging to the Cretaceous Era are found in Assam-Meghalaya- Tamilnadu- Pondicherry-Madhya Pradesh but Perisphinctes is not found as there were no seas in these regions when they were alive.

Different sorts of surface ornamentation are found on Perisphinctes fossils. As they used to float on the ocean surface, crinkling of the inner walls would happen, and Ammonitic Sutures would appear on the walls. Religious people call them Vanamala(garlands). On the shells Radial Costae(wall like structures) are observed. These branch out towards the edges; spines and holes are also found on them. The front opening of the shell is almost oval and almost all the patches are exposed. The outward varieties in design have been imagined as Conch-Chakra-Mace-Lotus etc. just as people have imagined various shapes and figures while staring at clouds or the stars. Similarly Hindus worship boulders that are brought on shore by running streams. Some take one step forward and call the silica veins running through these boulders, 'the sacred thread of Shiva'. Imagination can make everything possible. Cows climb up trees.

The essence of Swami Vedananda's write up

Now let's focus on Swami Vedananda's write up published in the Bartaman weekly magazine.

1. First he says that Shaligram Shila has its origin in the Himalayas, later adds that other than Gandaki in Nepal, its found in the Khasi Hills of Meghalaya, Narmada River Valley, Pondicherry and Trichinopoly in South India. This information is incorrect. In India Ammonite fossils are found in the Upper Paleozoic-Mesozoic rocks in the Himalayan Range (not Shivalik), in Jaisalmer region of Rajasthan, Kachh-Kathiawar region in Western India, in the oceanic Cretaceous rocks of

the Narmada River Valley (Central India) and in the Cretaceous rocks of Trichinopoly-Pondicherry; but *Perisphenctes*, which the Hindus classify as Shaligram Shila are found as much in the Himalayan Kashmir, Ladakh, Spiti (Himachal Pradesh) and Nepal as they are available in the Oceanic Jurassic stones of Kachh-Kathiawar region of Gujarat and Jaisalmer in Rajasthan. Though he displayed some skill in trying to pass off religion as Science, he has patently manifested his ignorance of Science.

2. He has written that this rock contains *Vajrakeeta* and *vajrakeeta* was a tapeworm like creature which was born about eighteen crore years ago.

Science does not acknowledge the existence of any creature named *Vajrakeeta*. It finds mention in the Hindu epic Mahabharata. It bit Karna when Parashuram was resting, with his head on his lap. We must take into account the fact that *Perisphenctes* or Ammonoids are not tape worm like creatures i.e. they do not belong to the Annelida group; they were snail like Cephalopoda group creatures; the Ammonoid group came into existence 41 crore years (not 18) ago in the Devonian period and *Perisphenctes* evolved 16.5 crore years ago during the Callovian period of Upper Jurassic Era.

3. Vedanandaji states, "the rocky layers are getting eroded by the swift currents of the river. Gandaki owes its black colour to the fierce friction which is dissolving the mountain side into the water." In his bid to pass off pseudo science as science, he ends up peddling pseudo science. We know that water is colourless. If a certain colour gets dissolved in it the water takes that particular colour. The frictional force generated by the rapid currents of the Gandaki river smash the black slate and shale rocks into powder, but they don't get dissolved in the water. They remain suspended in it in powdered form. The water appears black as it flows above the jet black shale or slate rocks. If we cup our hands and scoop up this water we

realize that it is colourless.

It should also be mentioned that the fossils trapped on the mountainside are brought down during the erosional activities of the thousands of rivers and glaciers as they descend from Kashmir, Spiti, Ladakh and Nepal (regions adjoining the Himalayan Range). Vedanandaji resorted to half truths as he was only interested in propagating the glory of Gandaki River.

4. It has already been mentioned what Vanamala (Ammonitic suture) actually is and people are free to imagine it as anything they feel like. But the effort to pose it as science and keep people consciously in the dark is despicable.

5. 'Worship of Shaligram shila brings untold benefits to the devotees' - this statement stems from faith and belief. Fact remains that since ancient times people, ignorant of the laws of nature have been worshipping fossils of ancient snails, trees, stones, rivers etc. just as they have been worshipping rats, monkeys, owls, elephants and horses. Science has come a long way, having dispelled the darkness of these delusions. The effort to resort to science in one's bid to provide legitimacy to these ancient customs is tantamount to give rotten articles new coats of paint and sell them in the market.

6. In his article the swamiji says that Bhagwan Satyanarayan is fond of coarse flour, molasses, bananas and milk. Floating in the ocean, the poor *Perisphenctes* would be hard put to get bananas or milk, so they would feed on minute organisms floating on the surface. They must have been unaware of the fact that later the Creator would lodge himself on them through the agency of man; surely they wouldn't have turned carnivorous had they known!

7. Does Vedanandaji know that the fossils which Hindus worship as the emblem of Vishnu are mostly female *Perisphenctes*? It's not possible to know this for someone equipped with blind theology. Knowledge of science is essential for this. Propagating a tale of eternal love by sticking

tulsi (holy basil-an emblem of Laxmi) on this Narayan, in that case, is tantamount to the advocacy of homosexuality. Would religious people refrain from worshipping Shaligram Shila from now on?

8. While singing the glory of Vishnu and Narayan, Vedanandaji had blabbered away old putrified religious rubbish, but he has done so, through clever turns of phrase, so that it becomes acceptable to contemporary readers.

At one point he says, 'Vishnu is the supreme power. It is under the influence of this supreme power that the Universe emanates, becomes stable and is destroyed.' On a different occasion he says, 'Today even science admits that the mark of the creator lies invisible or in subtle forms within his creations. Hence the creator can never be far away from his creations.'

Science does not recognize such an omnipotent supreme power, and therefore does not recognize the existence of the Vishnu, God or Allah of the religious people. Materialists have long since demolished the Supreme power theory of Vedanandaji. It's not unknown to Pandit Vedanandaji. In which scientific treatise did Swami Vedanandaji find all these things? The discovery of Higgs Boson particles in laboratory has hammered the last nail in the coffin of Creationism yet Creationists are still trying to pass off the particle discovered by the atheist Peter Higgs as the 'God particle.'

9. If Bhagwan Vishnu happens to be an all pervasive being, and he is present in all atoms and molecules, then why should the Gandaki-born, black, whole, Perisphenctes be the only emblem of Vishnu-the Narayan Shila? Why should only his worship provide the devotees sons and grandsons? Why should only its worship ensure familial bliss and attainment of Moksha on death? Why

wouldn't one attain these blessings if they worship Perisphenctes that are broken, incomplete, devoid of the classic characteristics? Does the swamiji consider the birth of a girl child a loss? That religiosity is the protector of patriarchy and opposes gender equality has been manifested throughout the write up.

10. The position Swamiji accords to women in patriarchal society becomes crystal clear from the way he glorifies Shaligram Shila, narrates the Puranic tale, the way he analyzes the timeless love of Laxmi and Narayan. How does Narayan's glory manifest itself in the rape of someone else's wife? Should such a character be considered ideal and reverential? If someone separates this raped Tulsi from Narayan shila, he'd have to suffer the pain of separation from his wife through successive births? The readers should pause and ponder over this?

11. Swamiji has written, 'Before the Big Bang.....the world was created.' Have the readers found anything connected with science in this statement? He has resorted to making a host of totally unscientific random statements and tried to paste a scientific label on theology. But half truths are always more harmful than outright lies. He has tried to achieve a great feat through cunning means. Any scientifically minded person would uncover this fraud.

It should be stated at the end that, such articles/news is being regularly published in the weeklies/newspapers of the Media house that 'fears no one other than God'. Not only in this newspaper, but such efforts are continually being made through all newspapers, tele-media, radio, stories-movies-plays-serials. Scientifically minded people should be vocal against such deceitful tricks. This article is a small contribution towards that goal. ■

Is it a paradox :

Egg or Chicken: Which came first?

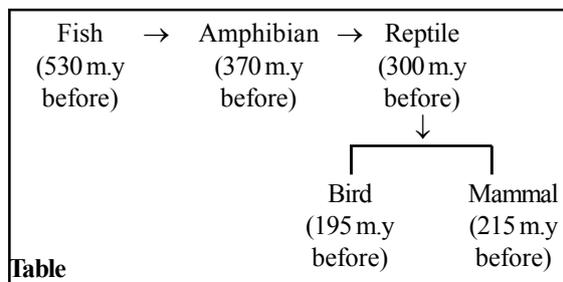
The historical source of the much debated conundrum can be traced to a statement made by the famous philosopher Aristotle (384-322BC). He said that egg from chicken or chicken from egg, whatever the case might have been, it was a natural phenomenon. He was confused over the entire matter as in the first place it's impossible for children to come into existence without their parents, and on the other hand, children can only become parents once they grow up.

On this issue Plato observed, every object exists in its ideal form before making its appearance in nature. Philosophers started delving into this question since the philosopher Plutarch posed this question in a philosophical symposium. Various ideas began to be floated. For instance, Sulla observed that the answer to this could be arrived at through the study of the origin of the Earth and that of life.

Stephen Hawking and Langer discussed this issue and concluded that 'egg came first'. In an article published in 1992 through a simple analysis, Roy A Sorensen postulated that the first chicken was created from an egg.

In the evolutionary transformative process of organisms, newer genus, species and sub species evolve from older ones through mutation, natural selection, reproduction, genetics and genetical drifts. During the transformation of one genus / species/sub species into another the mid stage transitional organisms become extinct through natural process. These are called Missing links. For instance transitional Archaeopteryx fossils bridging the evolutionary split between reptiles and birds have been found. (See Table)

Actually mutation is the alteration of the base pair pattern of a DNA molecule. Chromosomal change can also happen due to mutation. Body cell mutations are not passed on to the next gen-



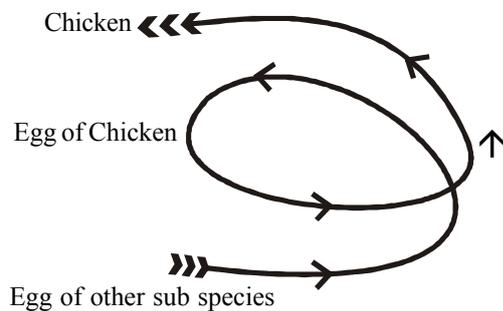
eration. But reproductive cell mutations are transmitted to both body cells and reproductive cells. Hence reproductive cell mutations are necessary for new species creation. According to the biologist Dobzhansky, evolution is the cumulative result of a series of small-scale mutations. Therefore the emergence of a new species or sub species from an older one is the consequence of a chain of successive changes. But we do not perceive every subtle variation. Perceptible changes take time to happen and depend on the length of the specific life cycle.

Class → Genus → Species → Subspecies

The scientific name of chicken is : *Gallus gallus domesticus*.

Chicken is a sub species of the *Gallus Gallus* species, the ancestor of which was the Red Jungle fowl. Humans have arranged for their breeding as they have been domesticated through the practice of animal husbandry. Through this method it has been possible to cross breed Red jungle fowl with Gray jungle fowl that belong to two different species. While most characteristics of the Red jungle fowl are found in the modern chicken, some features of the Gray jungle fowl can also be noticed. Different variants of this sub species are spread across various habitats.

In the continuity of evolution the egg from which the first chicken emerged did not belong to any chicken-it belonged to another species-the sub



species which evolved into chicken. Now the eggs that this sub species laid in order to ensure the survival of the sub species were eggs of chickens.

But these are metaphysical thoughts.

Again, the sub species preceding the chicken brought about certain mutations due to environmental reasons—only then could it be termed chicken. Evolution of new species through mutation due to environmental causes is rare. Even then, chicken comes first, followed by chicken's egg. There's a 10% possibility for such a thing to happen in reality.

If we try to analyze by taking into account the complete sequence of transformation of one sub species into another it's found that the changes that would make the birth of a chicken possible were incorporated in the egg laid by the creature which precedes the chicken sub species. The creature which hatches out from such an egg attains birth with that special change, which designates it as a chicken. So, seen from this perspective, egg is primary—as all the preconditions responsible for the birth of a chicken were present in the egg. Therefore between chicken and egg—chicken comes first, chicken's egg follows. The possibility of such an event happening in nature is about 90%. Modern Genetics and Molecular Biology provide such an explanation.

The same question is likely to arise for any organism. Those who are unaware of the scientific theory of evolution of living organisms might have confusions regarding this matter. Actually this problem is connected with two separate is-

—sues—1. the origin of species and 2. survival of species. Generally speaking, we try to seek its answer within the life cycle of the organism. The origin of the species is not taken into consideration—herein the method of seeking the answer becomes metaphysical. The other problem that presents itself is that the life cycle of an average organism is not wholly circular, it's spiral, even though to an insignificant extent. Therefore in every generation some change takes place, however negligible it might be.

Darwinian evolutionary theory was not discovered during Aristotle's time. Therefore it's only natural that there should be confusion regarding the solution to this riddle. But there is no ground for any confusion to persist on the 'egg or chicken' conundrum after the establishment of Dobzhansky's genetical evolutionary theory in mid-twentieth century. Yet such puzzlement exists among the educated and uneducated both. But why is it so?

In human society religious belief is handed down to individuals from generation to generation. In the scriptures and origin myths of every religion mentioned that god as creator of all creatures sent a pair of male and female of every organism on earth. Adam and Eve, the first man and woman as the primary ancestors to all mankind is a case in point. Viewed from this perspective, chicken comes first and egg later. Where did the first chicken come from? Sent by god. Therefore the issue of the origin of species has been negated in religious discourse. Thus, the roots of metaphysical thoughts lie embedded in religious belief systems.

Even after it was established that the solar system was heliocentric (Sun at the centre), Galileo and Bruno had to make sacrifices in order to make this knowledge accessible to the common man. Today, in the interest of the entire mankind, modern day 'Bruno's should come forward in order to remove the obstacles in the path of development of scientific outlook. ■

ADDICTION FREE TRIPURA: HYPE AND REALITY

– *Tripura Yuktibad Bikash Mancho*

Drug Addiction has become the central talking point in the state from the midst of the last year. The news of the crackdown of the State Government on illegal cultivation of cannabis (ganja) and illegal trading and hoarding of narcotic substances along with the resultant breakdown of rural economy has occupied centre stage in headlines of the local dailies, in the talk shows of Electronic medias and has been a major theme in the speeches of the ruling Party leaders as well of the ministers. We have witnessed that a huge volume of narcotic substances have been seized by the Administration in these months. On behalf of the ruling political party, Social organizations and local clubs are organizing “Consciousness Campaign” against addiction. The call for an ‘Addiction Free Tripura’ has been vociferously made through government hoardings, flex banners as well as market committee posters. In schools, awareness programmes are being organized in the name of wiping out drug abuse from the State. This has even been reflected in the theme pavilions of Durga Puja Festival.

It goes without saying that addiction has been spreading through society like cancer. It is our daily experience that drug addiction is destroying the very fabric of our society.

A large section of youth is in the grip of drug abuse and addiction. Sheer curiosity, the lure of cheap popularity and adulation in friend circle, delusion arising out of widely advertised perverted culture and glamorization of drug addiction, complications in relationships, scarcity of employment and depression are the underlying causes that drive them to addiction. It has also been observed that a large section of society, the working class, has also been made a victim of this social evil. One portion of this section is entering this addiction

world owing to the circumstances of day to day struggle for existence and poverty. We all know that Drug addiction provides a temporary escape route from day to day struggle and provides euphoric relief. Other than this section, higher middle class and rich people in search of thrill and stimulation, also indulge themselves in drug abuse, and embrace it as an escape route from monotony of their life style. Drug abusers and alcoholics face social harassment, become an easy prey of domestic violence. They also deplete the financial resources of the family, especially for the poor, and in turn enhances the volume of crimes in society. So it is needless to mention here that an initiative for creating addiction free society is absolutely essential. But the question arises whether State Government’s actions are actually aimed at that? For a direct answer we need to take a close look into the steps actually taken by the Government.

The whole premise of the argument of the ruling B.J.P. led coalition is the following: During the tenure of the erstwhile left front Government, Tripura villages and suburbs and bordering areas had been safe havens of illegal cannabis cultivation and hoarding and trading. Also thanks to the connivance of administration and a nexus between the then ruling Party functionaries with drug traffickers’ illegal drug marketing had become a formidable empire in the State. Networks of marketing and exporting of Restricted drugs which can also be abused as narcotics -such as sleeping pills anti depressant tablets, corex and phensidyl- had spread across the nooks and corners of the state. Any informed resident of the State would readily agree with the allegations as a whole. Now after installation of B.J.P. led coalition in the State in the month of march 2018, the said action against

production and selling of certain banned narcotic substances started with a lot of hue and cry.

Action on the ground includes destruction of cannabis cultivation field, confiscation and destruction of hidden caches of cannabis (ganja), confiscation and destruction during transport or illegal export to neighbouring Bangladesh, initiating legal action against ganja cultivators, traders, hoarders etc. Similar actions have also been initiated against illegal traffickers' of country liquor, corex and phensidyl.

As per media reports, the places from where maximum cannabis have been confiscated are Kamalsagar, Bishalgarh, Boxanagar and Dhanpur. Since 9th March to 31st October, 2018, 53 thousands 808 hundreds cannabis seedlings had been uprooted.

But why are these steps being taken? Is it for the reason that use of cannabis and other narcotic substances is detrimental to the society? But are any effective steps being taken against of cannabis consumption?

It is well known that cannabis and worshipping of all powerful God Of All God are inseparably linked in Hindu Mythology. Since time immemorial this has been practiced and is deep rooted in social custom. The ashrams and temples of this sect have not only served as storage dumps of ganja but the authorities and the disciples have been champions and promoters of ganja consumption in public. Does the Government have any plan to prohibit this public practice? Obviously not. Apart from that, in the lower strata of working class, the use of cannabis is extensive, because probably cannabis is the cheapest medium of intoxication. Neither consumption of ganja nor that of liquor has been banned by the Government, nor does it have any plan to do that. So why is the Government engaged in these activities? Isn't the answer self-evident? a simple minded person would retort, 'It's because cannabis cultivation and trade is banned in Tripura'. But the answer is a little more complicated. Take a look again. Can the

Government permit ganja cultivation and its trade and export? The answer is yes. Nobody will accept this until proof is provided. Fact is the Govt. Of India has sanctioned legal permission to four states Viz. Jammu & Kashmir, Uttarakhand, Uttarpradesh and Himachal Pradesh to cultivate and trade cannabis through license. (refer sources at the bottom of this article.)

It is relevant to add here that in the 1961 during signing of an international agreement on curbing of narcotic substances Government of India representatives argued against banning of ganja cultivation citing religious and social reasons and after a lot of deliberation agreed to only restrict ganja export to a certain extent.

This must be clear that when ganja is cultivated and traded and exported through licenses Government earns revenue from that and in case of such restricted substances, taxes and duties are kept exorbitantly high.

So when ganja is cultivated illegally Government is deprived of the revenues derived from the Licensee Fee, Custom Duty, Excise duty, taxes from the export & Import trade. On the other hand, licensed growers and trading companies, exporters and Importers experience loss on account of price cutting done by the Illegal producers. So, traders also create pressure on the Govt. to take steps on the issue. Besides, Black money is accumulated through this route, which however no Government of the prevailing system can stop.

This is to further mention that renowned in 2013 industrialist Ratan Tata of Tata Group and Rajan Anand, Managing Director of Google India have jointly established a 'Start Up', investing about 10 lakh dollars, to make a big entry in hemp (a variant of cannabis) business. This company is named 'Bombay Hemp Company' or BOHECO. This is obviously done under the pretext of ganja or hemp being used as raw material for medicines. So the question remains the same as permissions are being given for cultivation of cannabis. Media is abuzz with a news that a Bill could be presented before

the parliament for simplification of rules for this industry. This has also been learned that Brand ambassador of Patanjali Ayurved, Sanyasi Industrialist (!) Ramdev is keenly eyeing the splendid business opportunity of Hemp.

This is worth mentioning that the current actions of Government of Tripura in the name of creating an addiction Free State is not limiting its operations to ganja alone. This has also been extended to raiding and confiscation of illegal trade of corex and phensidyl cough syrup, sleeping pill and anti depressant tablet. operation is going on against illegal stock ,transportation and illegal transshipment across the borders. Is there anything different from what have been said against cannabis?.Due to extensive media reporting of action against Corex and Phensedyl cough syrup many people have perception that these two drugs must have been banned drugs , which is just contrary to the truth.

Abbott, the renowned multinational medicine manufacturer, is manufacturing Phensedyl and "PFIZER" is producing Corex .All know that these MNCs not only enjoy the confidence of Indian Govt. but also Internationally recognized multinational medicine manufacturers and marketing Cos. So, the production and marketing of these two products of them are entirely legal. Then why is the state Govt. taking step against this? Why is the Government taking actions against trading of these two syrups. Because these two, like many other drugs are listed as special category drugs which have certain restrictions on over the counter sales. These are to be sold through Doctors prescriptions and records of stocks and sales are to be kept accordingly. Export and Import license are compulsory to export these goods like other goods. Side by side , Bangladesh Govt. also has imposed ban on the import of corex and Phensedyl Due to huge demand of the drugs as narcotics and skyrocketing profits involved. Some traders are violating restrictions and the Government actions are directed only against them . As simpleas

that and nothing more to it!

So if we sum up all the action of the Government, we find these actions are simply against illegal manufacturing and trading of certain substances which are used as narcotics. Now are these only against narcotic substances? Aren't Government taking actions against all illegal trades? If a grocery shop is started without trade license, wouldn't Government take legal action against the shop owner? For that matter why do we only say this is against illegal trade, aren't Government taking action against any such illegal activity like helmet less driving or violating traffic rules ?

So, if we carefully set aside propaganda aspect of the hue and cry of "addiction free State" we can conclude that this much touted activity is just routine affair of the Government without which no Government can practically exist. And as we See ruling BJP led coalition is hyping this action against illegal drug trafficking as fulfillment of its electoral promises. We can further stretch this argument to the point that haven't we seen similar actions against illegal drug trafficking under the previous regime of left front run Government? One can however justifiably argue that was limited in scale and extent.

Here another most important thing that draws our attention is rampant business of other substances like cigarettes ,khaini, ghutka, bidi etc. Apart from these tobacco derivatives, the most menacing threat to the society is consumption of liquor or alcohol. Has the Government taken any action against manufacturing and sales of these substances? No way! Apart from closing down of illegal country liquor and spurious country beer shops Government has done nothing nor does it have any plan to do so. This is because selling and manufacturing of Foreign liquor, alcohol or country liquor is absolutely legal under Government license. In addition to existing provision State Government is actively considering issuing of bar license in the State . The hypocrisy of the Gov-

ernment becomes crystal clear when we take into account the fact that comparatively liquor consumption is having far more devastating effect on society than other form of narcotics mentioned earlier due to limited access and availability. It is a Known fact that life and well being of poor, downtrodden and labouring people are being devastated by the effect alcoholism every passing day. This is also known to all informed person that this section of people quite often comes into the street to protest against opening of liquor shops in their mahallas.

On the other hand, is there any raid or operation being launched against the licensed 34shops of foreign liquors or 53 local madeliquor establishments?

We can't figure out the exact reason of spreading of illegal cannabis cultivation and trading if we do not delve deep into the economics of drug business.

It is widely told to the cultivators to cultivate vegetables and cash crops throughout the whole year instead of ganja cultivation. But why the cultivators are not responding to this appeal ? Just like their compatriots spread throughout the rest of the country, the marginal cultivators of the state are not capable of recovering their expenditures of production by producing food grains, spinaches, vegetables or growing flowers. Even after coming of BJP led Government to power nothing has changed. This is a fundamental crisis of economy that small and marginal farmers can not find market of their produces and are forced to sell their produces at throwaway price which is often termed as distress selling. On the other hand ganja cultivation ensures huge profit even after bribing all Government officials and political party leaders. This is also a known fact that ganja market is spread not only across North India but also abroad. So it is the cost and benefit ratio that drives the farmers to ganja plantation and no moral lesson or lip service of the Government can keep the debt ridden farmers away from it. It should also

be kept in mind that severe rural unemployment is also dragging unemployed people to ganja plantation and transportation related odd works and thus the whole section of masses constitutes the social base for ganja cultivation.

Now finally we come to question why Government policies are not geared to rid society of addiction.

To have a definite answer to that , we need to explore the fundamental or the root causes of this social evil. The society in which we live, stands on the principles of production of goods and services through investment of capital in order to earn maximum profit by selling these in the market. This is profit oriented market economy. Here right from the education to treatment, from human organs to beauty, from killer weapons to Ideas and intellectual product are made to sell in the market to earn maximum profit. No exception exists. So everything is judged by the sole yardstick whether the product can bring maximum profit in minimum time or not. The after effect of this in society is considered only when the after effect tries to threaten the profit maximizing system itself. As a result, weapons of mass destruction that threaten the very existence of human civilization are also produced and sold at remunerative prices. Likewise narcotic materials are also sold at high prices in market. And that ensures maximum profit to those who invest their capital in the business. Not only that, Govt. also earns a huge amount from the taxes and duties on manufacture and sale of these substances. So whatever be the colour of flag of the Party in Government, it can't act against principles of profit motive System.

Now the opposite side of the same coin is Why does the demand of narcotic substances perpetually exist in the society ? This is also due to the characteristics of the same social system. When the profit motive system can not offer jobs to large sections of society, it deprive them from their inalienable right of livelihood. Our society find itself in a paradoxical situation whereby on one hand

science has ascended to a staggering height and social productive forces have developed at such a phenomenal rate that all the objects of human want can be produced in abundance but as the larger section of populace do not have the purchasing power to buy the products they can not fulfill their want and is constantly dragged to the rock bottom of abject poverty. So gloom descends upon the masses who are detached from the mass struggle to transform the world and they perforce seek refuge in drug addiction.

On the other hand, the upper section of the society, the masters of the profit motive system and those who are their subservient are constantly subjected to ruthless competition and risk of being dropped down the social ladder, constantly subjected to social uncertainty, despair and monotony of life take recourse of addiction as an escape route. Thus the system always generates demand for intoxicants like all other perverse and reactionary tendencies of the society. So the addiction free society can only come through the struggle to transform the profit motive system .

Source : *The Hindu, business line, july, 20, 2018.* Entrepreneur.com,12.1.2018. quartz.com 26.11.2018. the wall street journal- aditi malhotra,6.3.2015, Indian Express.com, Nandini Rathi, 20.2.2018. mjbizdaily.com - Avnish Pandya. Dainik sambad patrika.

Cat has finally come out of the bag

The ostensible enthusiasm of Ruling BJP led alliance in cracking down of illegal cultivation & trading of cannabis in the state and all its rhetoric regarding making state addiction free had finally been exposed by a recent newspaper report. Indian express Newspaper on 8th March,2019 published an interview of state Health Minister, in which he expressed his government's willingness to legalize cannabis cultivation and trade for medicinal use if central Govt. amends the law that bans cannabis cultivation and trade in the state. This news obviously vindicated the analysis of this article which was written one month prior to publication of the said interview. ■

Reader's Column :

Trust on science and logic discard metaphysical imaginations

– Shree. K

Science is meant for finding the truth but in regards truth many controversial concepts and beliefs are existing in the prevailing society. So many sayings come to our sight about 'satya' – the truth which influence our society to a great extent. One such saying is "Ram naam satya hai".

We see many people to claim the first age of creation of human society was 'satya yuga'. So common men are confused in regards the term 'satya', the truth.

Question also rises whether the way of truth leads to the destruction of 'satya yuga'. Then how did it vanish ?

Gandhiji claims that he did experiments with the truth.

The fact is that the common men want to lead a truthful life as well as they try to think truthfully about some facts. This wish inspires them to accept the aforesaid sayings. Accordingly in order to get the truth they used to do various activities. People also believe the saying like that whatever is powerful is the truth and whatever is beautiful is the truth. Naturally different diverse thoughts as well as contradictory thoughts capture the corner of common men. On the other hand the truth is not supposed to be an imaginary idea. The modern age set the idea

of truth on the alter of reality. They say whatever is happening in the material and social world is the truth and behind this truth there is material reason (of the objects or the society). Then how the saying 'Ram naam satya hai' may be believed as the truth because it's a name of a holy king only. The name may not be truth. Is there any material reason behind this or such imaginary concepts of the truth is accepted due to publicity and baseless belief?

We know matters (living or non living) are lying around us. Many of them put such impressions in our mind that they appear beautiful to us. Whereas some others create different sense of fury or ugliness or detestation. Would it be argumentative to consider that powerful objects are existing truly and the others are not true. The sight of a rose creates a sense of beauty in many minds and the fragrance of this makes us exotic. But is it the venom that a snake content is untrue? we should not think like this. Actually those things whether beautiful or ugly, whether powerful or powerless are existing in this real world. It is true to say that all those things are matters as well as all of them occupy space, has some mass and all those properties that a matter should have.

How someone can claim that he did experiments with the truth as it appears funny to listen that someone did experiments with unreal objects.

The fact is that in order to find the true reason of an event or true existence of a matter or its effects we have to find the real reasons (truly existing not imaginary) behind the facts. For that we should explain the matter from the point of view of science and logic. It requires experiments, observations and other supplementary activities. Let us take an example of Pox. Many of us say mother appeared in our body. So the patient should be given all those things in his/her lunch or dinner that he/she wants to take as it's the choice of the mother. But yes if he/she comes from a Hindu family must not be given non vegetarian items.

This modern world had proved that its nothing other than a disease caused by the micro organism.

Attempts had been made even by W.H.O to abolish the disease by vaccination or by other similar method. The fatal germs are vanished almost. It predicts that it is useless to run after the imaginary views.

Let us take some other examples about the appearance of the Ganges on earth. There is wide publicity about the belief that it appeared on the earth through the curls of Lord Shiva from the heaven to earth and the water if sprinkled at any place it becomes holy. As if all activities of tidying up or cleanliness are in vain. On the other hand the appearance of the Ganga may be explained in a real and scientific way.

It is observed that the high hill tops are always clad with ice due to natural reasons. The water particles gather on the top and freezes to form ice. Again due to heat of the sun and as well as heat from within the earth it melts incessantly. And in the course of falling down from the top to the plain many tributaries join them. For further clarification more observation and experiments are required to be done. Then only the disaster caused by the Ganges and other like rivers may be kept under control and this tremendous power may serve the humanity. Obviously the reason of flow is the difference of potential energy between the high altitude and the plain.

We have never seen our mothers (maa, maasi maa, grand maa, step maa) to flow in liquid form. But it is erroneously said that it depends upon our believe. If we believe the river to be our mother it becomes our mother and if we don't it becomes flowing water only. Every now and then we listen "maano to main maa hoon na maano to main bahta paani". Now let us be rational to think which of the statements do you consider to be true. Are really we born from this river, from the womb of this river or from real woman who is named mother as per the system of our society? The question is whether that woman who gave birth is our real mother or who we believe in to be our mother - the river Ganga?

Everyone knows that the energy obtained from the flow of water of rivers produce electricity. This energy further is applied to wide sectors of production. Then which side should we accept ? that the river Ganges is actually a course of flowing water or we believe it as a mother. May we dare to spring upon the mother's chest hoping to get a shelter in her lap or there is fear of drowning in water if we can't swim.

Many others claim the cows to be our mother. The question again dwindles between the logic and orthodox believes making the matter foggy.

The question is not confined between two opinions, which is true or which is false. The problem lies if we don't take the side of reality and logic and get away from the science we can't get the deserved result.

One example may be sighted to make the idea cleared. We live in a remote locality of Bihar, educationally and economically a backward place. In spite the use of modern equipments in agriculture has increased. Most people depend on agriculture but nowadays less work force is required and the requirement is going down. On the other hand most people are coming from land labour or marginal farmer classes. They used to spend the larger part of the year at distant places in search of their livelihood. In small grade jobs in industries or towns any how after facing all hardship they earn the minimum expenses for their families. Even in these days of science and technology different forms of superstitions and orthodox ideas are extremely effective on them. This is due to their lack of scientific education and logical senses. This lacking brings about more misery in their lives by wasting money and other property on useless believes. every year lakhs of people starts for collecting water from the Ganga by walking thirty to forty mile bare footed. Again they start for pouring the 'holy' water on a stone piece in the hope of getting a happy and prosperous life. But what is the reason in back of their misery and unhappiness ? if we explain the society and social rules and sys-

tems scientifically and logically we come to know the real reason behind that the society has historically developed in a classified one. All the wealth and things of happiness they produce are being taken away by an organised exploiters. Unless the system does not turn to the correct direction the search of happiness and peace may not reach its goal. Moreover the wastage of such hard earned money may not be stopped too.

Every now and then we come across such examples. some of them are found in local basis. One such example is about ripe mangoes. They say that if ripe blackberries are taken along with ripe mangoes the blood turns into water instantly. This idea provokes people to cut down the blackberry trees. Whereas the doctors suggest that ripe mangoes contain much more sugar and are useless for diabetic patient if taken much. They also say that blackberries are useful for dibatic patients.

It is said that when some sinic spirit appears on some person his behaviour becomes abnormal and fanatic. For remedy he is hited by brooms strongly and after that in a closed room he is put emid the vast smoke of burn red chilli. They believe this idea for getting rid of that ghostly spirit. In this way disturbed person is bound to face the cruel atrocity. But in fact such accentuation comes due to either physical weakness caused by lack of nutrition or due to mental agony failing to recover the reason of his failure in life that goes against the expected direction. In most cases these orthodox believes lead these activities. The remedy is only possible if the real reasons be found and treated accordingly.

This requires the wide publicity of scientific and logical way of thinking, modern scientific education, laboratories for experiments for practical education and organised debates to sharpen the logical ideas in society. Along with this we need to expose the dirty reason behind these orthodox and unscientific concepts which is being spread by different organisations in which ministers and so called mulla-pandit are also involved. ■

Arsenic Problem and its remedy

People of nearly 30 countries in the world are suffering from arsenic pollution of underground water. Bangladesh & India occupy top positions. Millions of people of Nepal, Vietnam, Cambodia, Thailand, Peru, Chile, Brasil, Argentina, Taiwan etc. are suffering from arsenic pollution.

What is arsenic?

Arsenic is an element (As), which has atomic number 33. Actually it is a metalloid which has metallic as well as non metallic properties. The electronic configuration of arsenic is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$. In nature arsenic generally occurs as solid substances & its valencies are -3 , $+3$, $+5$. Arsenic may also be found as native element (As) but mainly they are found in nature as arsenide (of -3 valency compound), arsenite (of $+3$ valency compound) & arsenate ($+5$ valency compound). Mainly arsenite & arsenate compounds are injurious to human body. Arsenic bearing inorganic compounds are more harmful than arsenic bearing organic compounds. Industrially produced Paris green (copper aceto arsenite), calcium arsenate & lead hydrogen arsenites are used as poison and pesticides as well.

Sources of Arsenic in human body

In nature (specially in ground water) the main source of arsenic is arsenic bearing mineral. Arsenic as native element is very rare in nature. In minerals, arsenic generally occur in two forms – $MAsS$ & MAs_2 , (where $M = Fe, Ni, Co$ & $As =$ arsenic) such as arsenopyrite ($FeAsS_2$), Realgar (As_2S_3), Orpiment (As_4S_4). Other than these certain sulphide compounds of Fe, Au, Pb, Zn, Ag may



contain little amount of arsenic. Arsenic ranks 20th position within the elemental composition of crust (Oxygen in number one position & Silicon in number two position). In the soil & rock of the crust average content of arsenic is $0.0002-0.0005\%$, in coal (numerous sulphide minerals occur) upto 10 mg arsenic may be found per kilogram. In some varieties of coal 1000 mg arsenic may be present per kilogram. In non polluted virgin soil about 40 mg arsenic may be found per kilogram of soil. Again in polluted soil it may range upto 500 mg per kilogram.

Arsenic may be present in a good amount in vegetables, rice, apple, grapes, sea fish & other sea foods & poultry meats. According to the United Kingdom's Agriculture-Fish & Food Department, the people of UK take 1.46 kg food per day which contain less than 0.00081 mg arsenic. Sailors of China & other countries consume plenty of sea fish & thus 93% of them ingest 0.0021 mg arsenic with food. In India, consumption of arsenic with food vary according to economic status, geographic position & cultural habits. The arsenic that people consume from plants & animal food are mainly arsenobetaine, which is less harmful.

A person daily takes 20 cubic meter air from the environment. This amount of air contain 0.00024 mg arsenic on an average. Workers of metal-steel & alloy industries, thermal power & colliery on an average consume 0.006 mg arsenic during work. Arsenic is also added to our body during smoking.

But a person does not take arsenic in his/her body from drinking water. In groundwater there are Methyl arsenic acid, dimethyl arsenic acid, arsenate and arsenite and of these one third is arsen-

ite. If a person takes 1.5 litre ground water daily, he/she automatically takes 0.015 mg arsenic on average. In tropical & subtropical countries if people take 2-4 litre of ground water then he/she may consume 0.3–0.75 mg arsenic. According to World Health Organisation (WHO) Sealed mineral water of various companies contain 0.2 mg arsenic per litre. According to WHO the maximum limit of arsenic per litre of water should not be above 0.01 mg. But ground water of Ganga-Brahmaputra river valley of Indian subcontinent contain 0.05 mg or more arsenic compound on average. For this reason Government of India & Government of West Bengal have declared that upper limit of arsenic compound in ground water should not be beyond 0.05 mg/litre. This is 5 times more than the WHO's standard. So root cause lies there.

In conclusion it may be stated that incorporation of arsenic compounds in human body results mainly from drinking water (specially underground water) and these are mainly inorganic arsenic compounds which are much more toxic than organic arsenic compound (which are taken from food).

Hazardous effect of arsenic in human body

How arsenic compounds are incorporated from air, water & food in human body is still unknown. Researches are going on. An adult person's body contains 3-4 gm arsenic. Percentage of arsenic increases with age. These absorbed arsenic compounds are deposited in liver, kidney, lung, spleen & skin. In human body most arsenic compounds are found in hair & nail [as keratin tissues contain high amount of sulfhydryl]. Other than these uterus, bone, muscles & other tissues may also absorb arsenic compounds.

Water dissolved inorganic arsenic compounds (+3 & +5 valencies) such as sodium arsenate (NaAsO_2) & Disodium hydrogen arsenate (Na_2HAsO_4) are easily absorbed in human body. Experiments have proved that human digestive system absorbs arsenic acid in considerable amount.

It is still unknown that where & in what amount arsenite (+3 valency) & arsenate (+5 valency) are absorbed in human body. Research is going on. But through intravenous injection of As^{74} (a radio active element) containing arsenite solution and by oral application of arsenate solution in human body it has been observed that arsenic compounds are absorbed in kidney, liver & muscles. It is more stable in muscles than other organs. Pregnant women transfer arsenic compounds to their babies through their placenta.

Different scientific experiments have proved that certain percentage of arsenate & arsenite compound present in the human body, are removed through urine through a methylation process, and other portions of these compounds are absorbed in different organs. Poisonous effect of organic arsenic bearing compounds are still unknown. From experiments it is evident that organic arsenic bearing compounds are removed from human body in unaltered form through excretion.

Arsenite (+3) & arsenate (+5) rich compounds enter human body from natural environment and from chemical laboratories or from industry (as from arsenic bearing pesticides, burning of coal or smelting plants etc). Arsin (AsH_3) enters human body only from industrial pollution which is very poisonous. Researches also proved that arsenide & arsenite (-3 & +3) are more poisonous than arsenate (+5) compounds. Solubility, particle size, rate of absorption, metabolism & excretion of those compounds play important role in such toxicity.

Experimentally it is proved that arsenic poisoning in human body and other animals vary with arsenic compounds in decreasing order of abundance :

1) Arsinos 2) Arsenite (+3 valency inorganic compounds) 3) Arsenoxide 4) Arsenate (+5 valency arsenic acid) 5) Arsenobetain (mainly organic arsenic compound)

How arsenic poisoning happen?

Such researches are going on for last 65 years or more. Scientists are of the firm opinion that ar-

senic, specially arsenite, reacts with Sulphydryl-SH group compounds in human body. As a result tissues related to the oxidative system got effected, specially organs like kidney, liver, lungs & different organs wall & skin. Due to this, enzyme-secretion for metabolism is disturbed & thus metabolism of fat & carbohydrates gets disturbed which in turn hinder the respiration process. **Arsenate** is uncoupling mitochondrial oxidative phosphorylation. This happens due to continuous replacement of phosphate ions with arsanate radicals & thus arsenate ester is formed & it readily dissolves in water. This biochemical reaction disturb the action of brain.

Toxic symptoms & health problems

Due to toxic effect of arsenic the main symptoms seen in human body are fever, diarrhoea, vomiting tendency, irritation, hair fall etc. Continuous toxic effect shows melanosis, keratosis, desquamation & finger nail change. The patient suffers from anemia & leucopenia & enlargement of liver. Due to anemia & leucopenia, blood cells & bone marrow get damaged. Inorganic arsenic compounds affect liver which gets fatty, destruction of cell & finally leads to cirrhosis. Body gets yellowish & finally death occurs. Toxic effect of arsenic results in nephrosis of kidney. Scientists of International Arsenic Research Centre in 1980 declared that inorganic arsenic compound are responsible for skin & lung cancer. Continuous ingestion of excessive amount of arsenic compounds results in malignant tumor.

How underground water gets arsenic contamination?

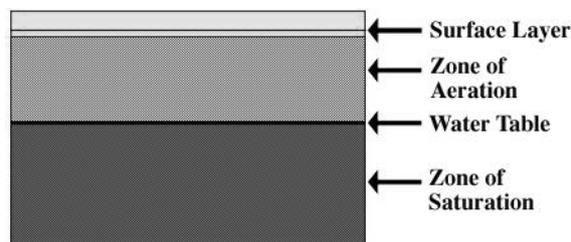
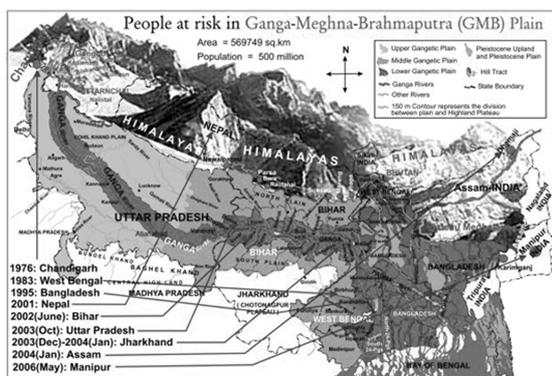
In scientific world it is now widely accepted that regular drinking of underground water is the main cause of arsenic toxicity. For contamination of arsenic in ground water, it is the natural process and not industrial pollution that is the key factor. **The Ganga-Brahmaputra river valley of India & surrounding Bangladesh is the world's largest & deadliest arsenic prone area.** This is due to natural sedimentation process & not due to in-



dustrial pollution. The groundwater of industrial areas of Mumbai, Gujrat, Orissa & Raniganj-Asansol-Durgapur industrial belt of West Bengal are almost free of arsenic contamination.

Arsenic bearing minerals (such as arsenopyrite, realgar, orpiment & other sulphides) of the crust are the main sources of ground water arsenic compounds. Weathering & erosion of these minerals by natural agents (river, glacier, wind) bring them into soil. It is not necessary that the ground water where source rocks containing large amount of Arsenic bearing minerals are found, would be rich in Arsenic content. In the upper part of the crust Fe & Al play important role of absorbing arsenic from the soil. There are two main factors which play important role in dissolution of arsenic compounds in ground water. These are: 1) there should be some special biogeochemical processes facilitating the transfer of solid arsenic compound or its suspension into underground water. 2) Within the aquifer, it requires sufficient time for the arsenic bearing compounds to be stored in it. In nature when these two conditions simultaneously mature then the aquifer becomes rich in arsenic compounds.

Most geoscientist believe that under reducing environment arsenic rich iron oxyhydroxide (FeOOH) formation is the key factor for the presence of arsenic bearing solution in the groundwater. In the zone of oxidation due to the dual presence of iron & oxidizing condition inorganic arsenic rich FeOOH are deposited on the soil top. When



GROUND WATER TABLE

this soil subsides & reach the zone of reduction (below the ground water table) they get dissolved in the ground water by reducing chemical reaction. Underground peat (lowest grade coal of Ganga-Brahmaputra valley) give rise to organic compounds



(Solid As (acetate) (As solution)

bearing
suspension)

Volcanic lavas rich in arsenic compound may also add ground water into arsenic solution. In Chile of south America such process is the main reason for arsenic contamination in ground water.

Why Ganga-Brahmaputra River Valley is the main arsenic prone area of the world?

According to National Institute of Hydrology, Roorkee (2008) West Bengal, Jharkhand, Bihar, Uttar Pradesh, Assam, Manipur & Rajnandgon village of Chattishgarh is the main arsenic prone area of India. Of these West Bengal, Bihar, Jharkhand, Uttar Pradesh & Chandigarh-Haryana area fall under Ganga & its tributary & distributary vallies. Places of Assam fall under Brahmaputra & Barak river valley. Districts of Manipur fall under Imphal river valley. Districts of Assam fall under Brahmaputra & Barak river valley. The Imphal river valley (tributaries of Brahmaputra) of Manipur and Rajnandgao village of Chattishgarh are Arsenic prone. Some places of Andhra Pradesh are outside the Ganga-

such as acetate through fermentation. These organic compounds release the Fe^{2+} , As^{5+} ions dissolved in ground water and form inorganic arsenite & arsenate solutions. The chemical reaction is :

Brahmaputra River Valley. In West Bengal, 3417 villages of 111 blocks (Malda, Murshidabad, Nadia, North 24 pgn., Kolkata, South 24 pgn. (apart from Sundarban), Murshidabad, Coochbehar, South Dinajpur & western flank of Howrah-Hoogly & east Bardhaman are arsenic prone. In Bihar 57 blocks of 15 districts are arsenic prone. Sahebgunj district of Jharkhand (17 village), two districts of Assam, Imphal valley of Manipur, Rajnandgao village of Chhattishgarh, Chandigarh and surrounding areas of Punjab & Haryana & some places of Andhra Pradesh are arsenic prone. (fig : Ganga-Meghna-Brahmaputra)

In Ganga-Brahmaputra river valley 360 million people live within 529674 square kilometer area of these 50 million people under 88688 square kilometer (including Bangladesh) live in the most arsenic prone area of the world. Millions of people of this area are suffering from arsenic related disease only due to regular drinking of ground water. (Fig : Arsenic prone Area, West Bengal)



What are the sources of arsenic in this area?

It is already stated that in this area the cause of the presence of arsenic solution in ground water is natural. Detailed studies revealed that youngest soil (Holocene sediments, upto 12000 years old) rich in sand, silt & clay of this area get arsenic solution from the following sources :

1) upper Gondwana coal of Rajmahal Basin (Rajmahal area of Jharkhand & Birbhum district of West Bengal) such as Sahebgunj area. Coal of this region contain 200 mg arsenic per kilogram.

2) Bihar-Jharkhand Mica Belt (Munger & Gaya of Bihar, Koderma of Jharkhand). The mica peg-

matite of this area contain 0.08 to 0.12% arsenic minerals.

3) Shale and soil of Sone area of Bihar. The rock & soil of this area contain 2.8% arsenic.

4) Pyrite rich shale rock of Proterozoic Vindhyan range. This pyrite rich shale contain 0.26% arsenic.

5) Darjeeling, Nepal, Sikkim & Uttarakhand Himalayan rocks as well as sulphides of Garubathan area. Numerous rocks of Himalayas are rich in sulphide minerals such as pyrite, arsenopyrite, chalcopyrite, galena, sphalerite etc. These rocks contain 0.8% arsenic.

Most of the geoscientist indicate the Himalaya as the main source out of these five main sources (M Arthur & co-authors 2004).

During weathering & erosion process arsenic rich minerals of Himalayas are brought down through springs & rivers into quaternary (2.5 million age) soils. Mica rich soils - sand, gravel, soil & clay etc are deposited on the river delta. These soils spread from west to east & southeast by the river Ganga &

its numerous tributaries & distributaries. Brahmaputra & its tributaries/distributaries are carrying it from northeast to south-west direction. Tista-Torsha & Meghna are carrying this towards south.

Geohydrologists observed that only the youngest Holocene soil of Himalaya are rich in arsenic. These arsenic solutions are stored within numerous aquifers of this region. Where, between two aquifers (vertically) there are aquiclude & aquitards, the top most aquifer only stored arsenic & not the lower one. So in this region aquifers of 350-2000 foot or even deeper do not contain arsenic. But in areas where aquifers (vertically) are linked with each other, even though initially no arsenic was observed in the lower aquifers, with exhaustive use of shal-

lower aquifers deeper aquifers got gradually contaminated with arsenic.

It is now proved that in the Ganga- Brahmaputra river valley of India (& Bangladesh) only younger Holocene (upto 12000 yrs old) soil contain excess amount (out of limit) arsenic. With time Himalaya keeps rising & the courses of rivers change with time. With rising of Himalayas arsenic rich minerals & rocks are getting exposed to the surface & get eroded. At the end of Quarternary Era, in the Holocene epoch (nearly 12000 yrs ago) i.e. after the last ice age rate of weathering of arsenic bearing minerals has increased & thus arsenic rich soils have grown in quantity in the Ganga-Brahmaputra river system. Thus Arsenic deposition in soils & ultimately aquifers of younger soils have been increasing over the last 12000 years. Older soils of Bengal Basin such as in the area of West & East Medinipur, Purulia, Bankura, west Bardhaman, Birbhum & Western part of Murshidabad-east Bardhaman-Hoogly-Howrah are poorer in arsenic. In general in West Bengal, the eastern part of Bhagirathi & Hoogly river is rich in arsenic.

What are the remedial process?

There are four main processes through which drinking water free of arsenic could be supplied. These are as follow :

- 1) In situ remediation of arsenic from aquifer.
- 2) Ex situ remediation of arsenic after lifting of ground water from aquifer.
- 3) Use of surface water (river, lake, pond, sea) after proper purification.
- 4) Deeper or very deep tube wells which are from safe aquifer for supply of arsenic free ground water.

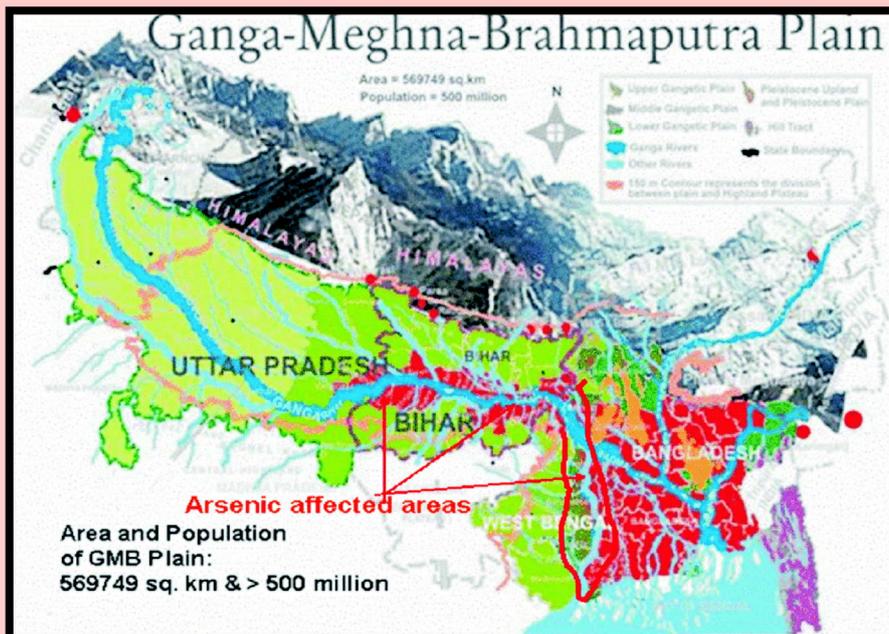
Nowadays using modern technology such processes are being used in different parts of our country. Although due to adequate investments & maintenance problem still prevails.



Women collecting arsenic free water

Our Demands

- 1) To all citizen of this country germ & toxic free and inorganic-organic chemical free water should be supplied free of cost. All businesses related to drinking water should be banned.
- 2) Depending upon regional topography & climate either clean & germ free surface water or arsenic & other chemical (such as fluoride) free drinking water should be supplied in adequate amount to all citizen.
- 3) All patients related to arsenic & other chemical effect should be treated free of cost. In every block level of affected area arsenic clinic should be opened free of cost.
- 4) Family of the people who had died or suffering from arsenic or other chemical related diseases, should give proper compensation. ■



Arsenic affected areas : Ganga-Meghna-Brahmaputra Plain



Shaligram Shila

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