

Nuclear Energy: Myths & Reality

*With the Indian Science Communication
Scenario as Backdrop*

by

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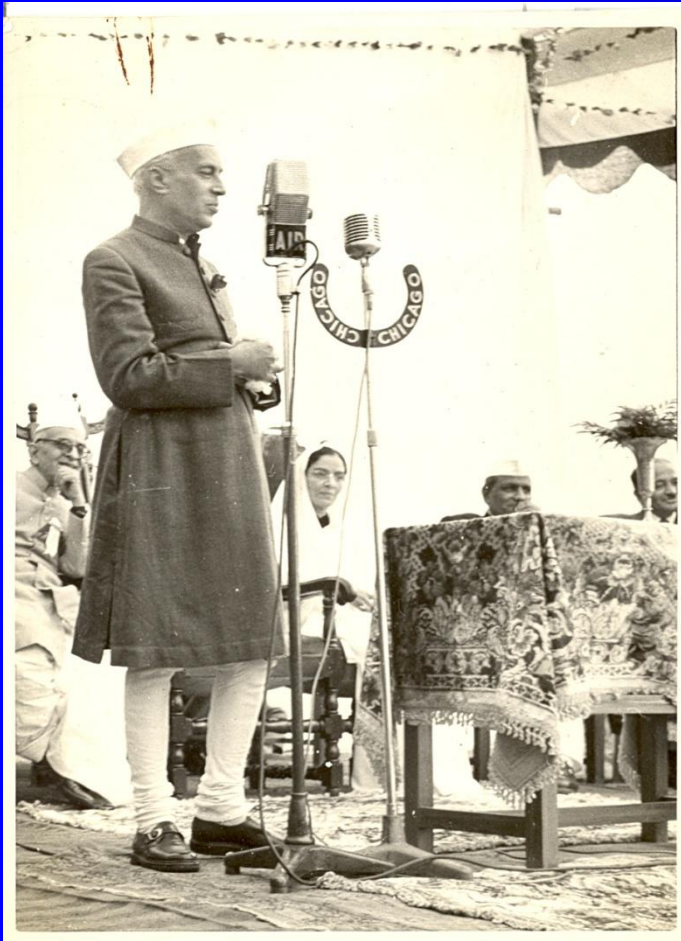
The building's foundation stone was laid in 1949, and the completed building inaugurated by the then PM Pt. Jawaharlal Nehru in 1953

Energy Scenario in India

Sector	MW	Percentage (%)
State Sector	94,153	37.1
Central Sector	68,993	27.2
Private Sector	90,903	35.8

Fuel	MW	Percentage
Total Thermal		
Coal	1,52,971	60.2
Gas	22,608	8.9
Oil	1200	0.5
Hydro (Renewable)	40,799	16.1
Nuclear	4,700	1.9
RES (Small Hydro, Biomass gasifier, Biomass power, Urban & Industrial. Waste power		
TOTAL	2,54,049	

Myths can be busted through promoting scientific temper.



Indian constitution considers it a fundamental duty under Article 51A (h) to develop the scientific temper, humanism and the spirit of inquiry and reform.

We must distinguish between scientific knowledge and scientific temper

The Fallacies in Public Mind

- Many equate nuclear energy to nuclear bomb!
- Hence, they think, naturally that it's disastrous & that
- Promoting Nuclear Energy means inviting hazard

It required to conjure up all courage and tact to explain to people the basics of nuclear energy

All the views expressed are my personal views

The Obstacles:

- Canards may be spread which may include concocted stories, exaggerated claims, rumours
- Blowing up unrelated events or non- events
- Vested interests: No comments!
- Exaggerated estimates of nuclear power cost and price, suppressing of vital advantage with respect to the environment and ignoring the facts of dwindling fossil fuels and expected growth in their prices

'It Damages Environment'

- Nuclear power needs less land per MW of installed capacity, about 0.08 hectares/MW as against about 0.2 to 0.5 hectares/MW for TPP
- Out of the total land acquired for a NPP, hardly 20-30% is used for structures for the plant and facilities. Most of the area devoted to a green collar.
- No human in “Exclusion Zone,”



Quoting Cases of Obsolete Technologies and Sheer Callousness

- Quoting Three Mile Island, many decade old Chernobyl (1950 design) which didn't even have containment shield, or the unfortunate consequence of rare tsunami and earthquake striking together an old, outdated and not- maintained plant in Fukushima- Daichi

‘Public Not Taken in Confidence’

During the past decade, NPCIL conducted

- Structured public awareness campaigns,
- Organized exhibitions, held debates and discussions on nuclear power and in and around the NPP sites.
- In addition, several meetings, exhibitions, visits to sites on relevant issues have been held between NPCIL and all the stakeholders, including the project affected persons,.

The Water temperature Rise

- In one case, it was alleged that the temperature rise for cooling water from plants would damage the fauna, flora.
- The reality is that the 5 degree raise is well within the permissible range of 7 degree C by MoEF.
- The surrounding of the NPP is lush green, with flora and fauna in pink!
- The motorboats, Thermal Power Plants etc. also have the same effect!



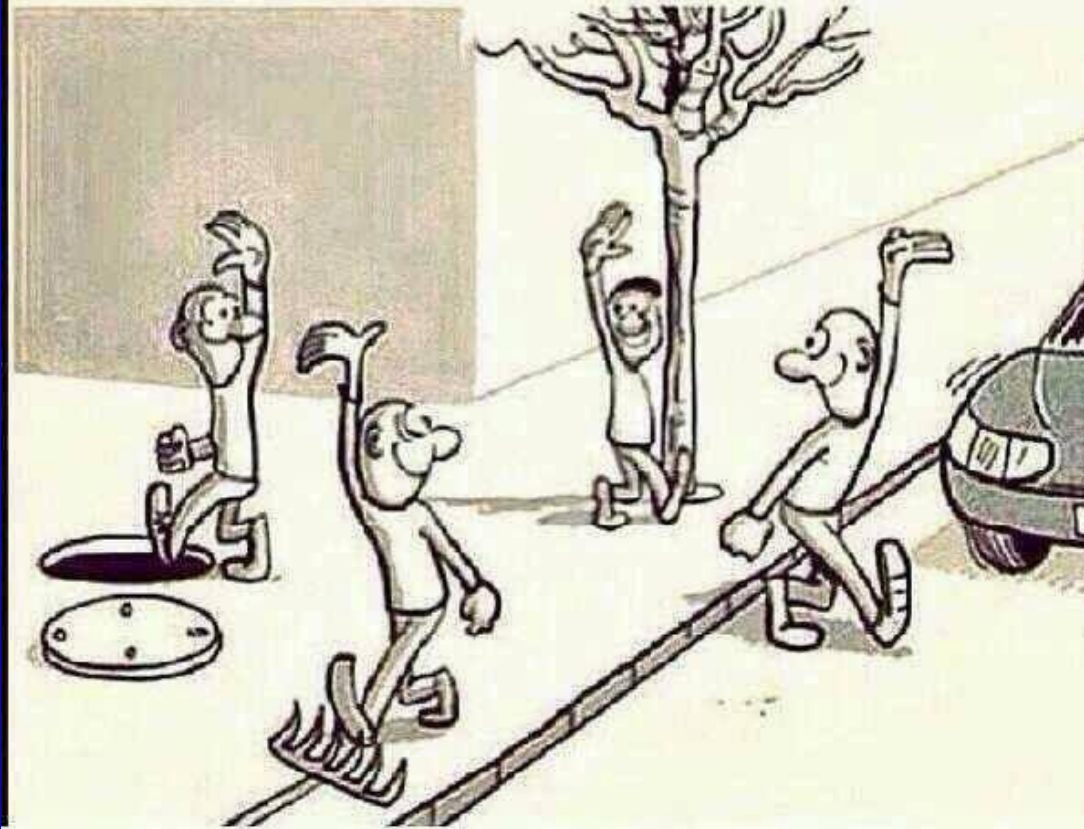
The Blind Dolphins!



- A disturbing report appeared in the Indian newspapers an year ago: Dolphins in the most revered Indian river Ganges in Bihar turned blind due to the effect of radioactive wastes released from Narora power plant, (Buland Shahar, UP).
- Disturbing for another reason: There was no trouble near the plant itself and we had seen it ourselves! Why'd the effluents cause damage 1000 km away but not in the vicinity!

- ...and the Gangetic dolphins have always been known to be blind, always. They navigate with sonar waves!
- This is because they have non-crystalline eyes.
- This information may be accessed even on the Wikipedia freely.

Nobody knows when the last
goodbye is

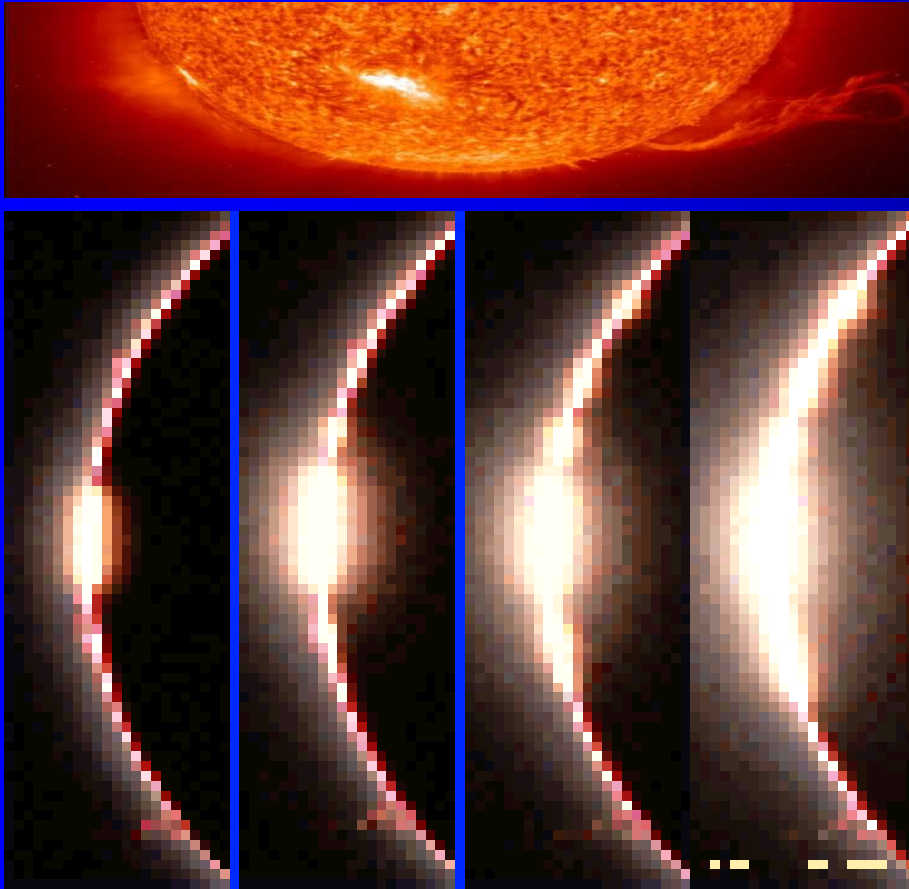


- But we all take calculated risks based on probability and our experiences

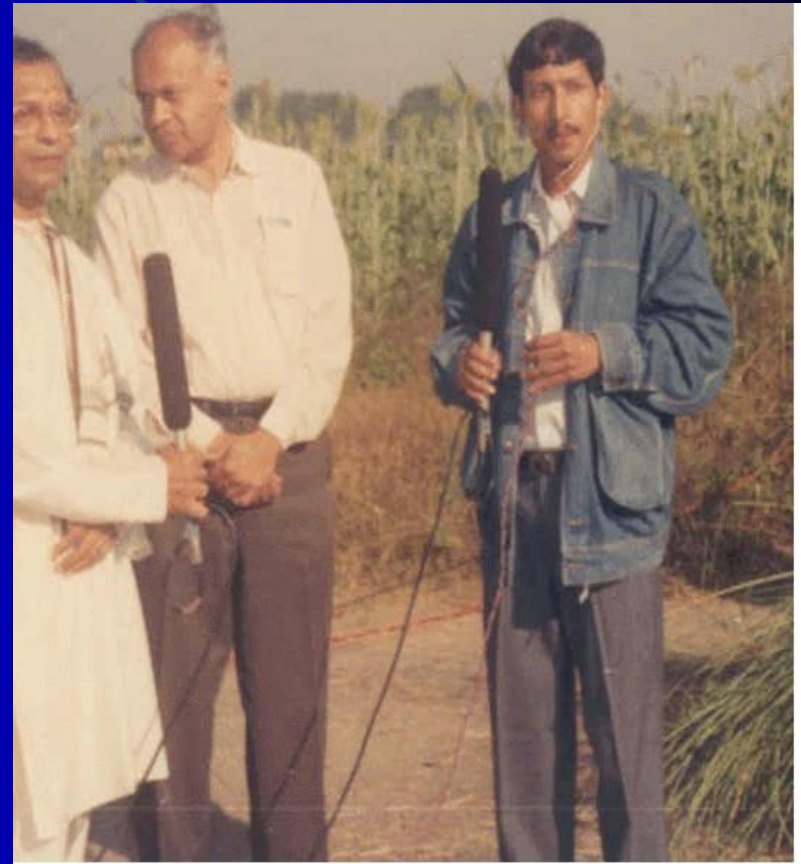
Communicating Science to Layman: Approach and Scenario in India

- The Serious efforts in science communication during pre- independence
- After independence Govt. & Non- Govt. efforts
- What appeals to people
- How to educate them to help take informed decisions

The Truth Should Be Explained



- Compare with the deserted road scenes in 1980



Total Solar Eclipse- 1995
Live telecast from Iradatganj



This Experience Was the Strength

Basic elements that draw people

- 1. Some interest**
- 2. Curiosity (super natural?)**
- 3. Relation with life, past, future**
- 4. Relation with economy/ quality of life**
- 5. Emotions/ Relationships**

Show relation to these and they'll be interested

The TSE- 1995 Seen in India

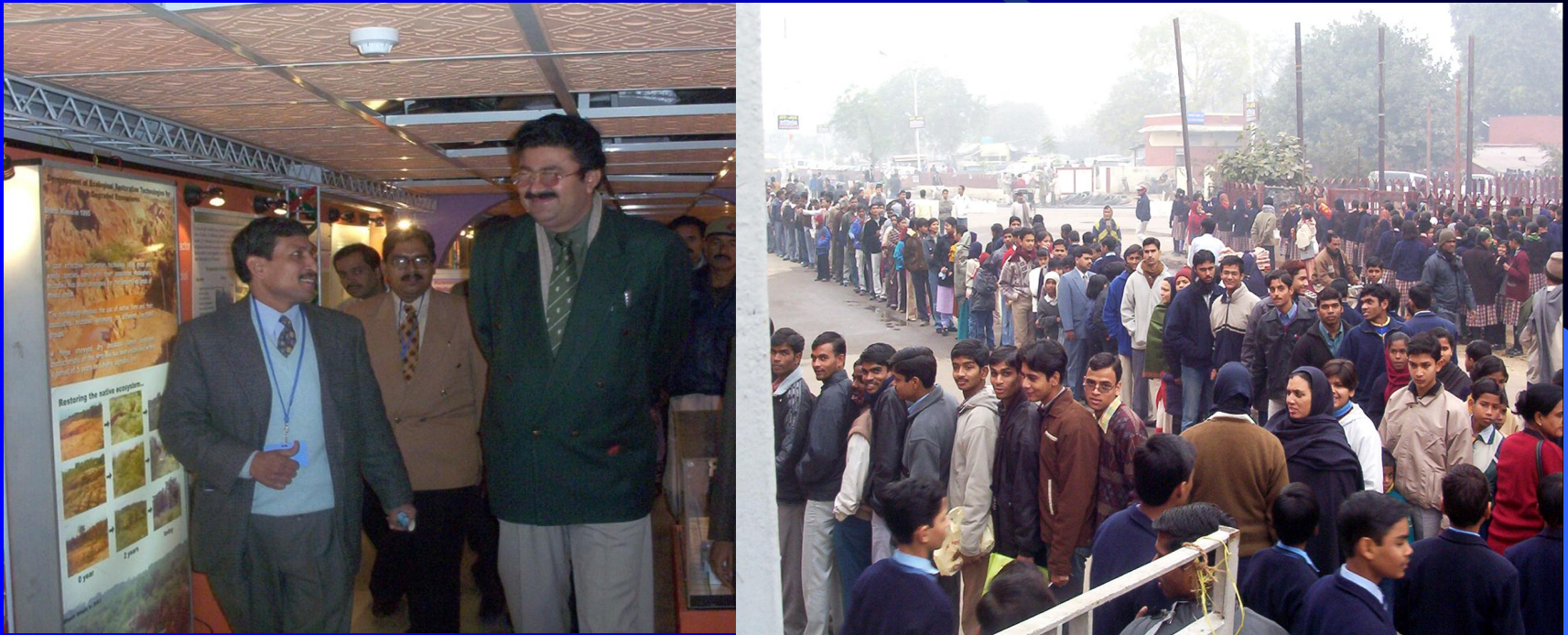
**Media can
influence
minds
positively
too!**



So we knew it's possible to influence their opinion in fair manner

Vigyan Rail-

the element of novelty drew people



The train received tremendous response

The Serpentine Queues to See Vigyan Rail (Science Trains)



Developing Societies Must Learn to Deal with Rumours



It was an interactive approach, a novel form of communicating and led to telling them science they never knew earlier.

दैनिक जागरण सीतापुर

लखनऊ
21 जुलाई, 2002 5



लखनऊ से पहुंचे विशेषज्ञ डा. राज मेहरा तथा सी.एम. नौटियाल लोगों से पूछताछ करते हुए

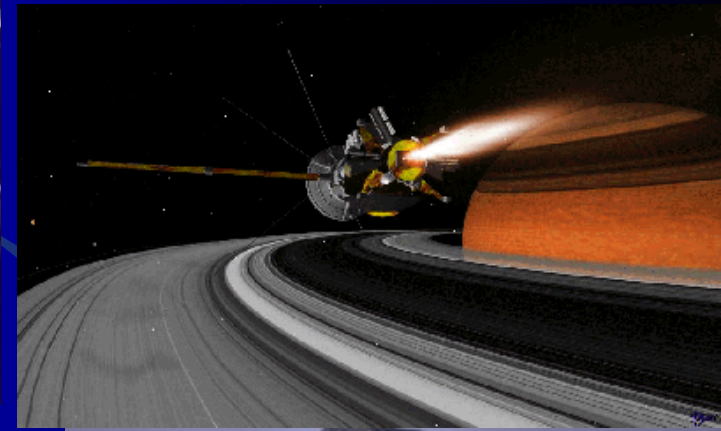
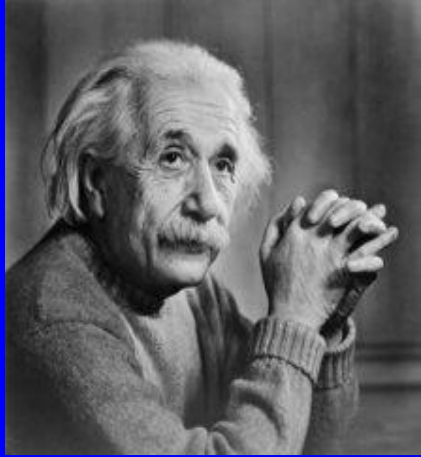
छाया : अकबर

रहस्यमय छाया की सच्चाई जानने वैज्ञानिकों की टीम पहुंची

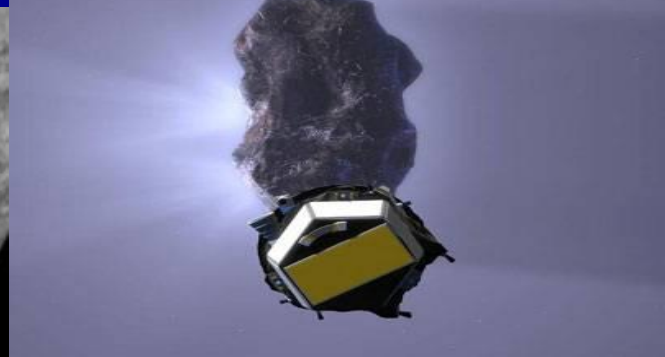
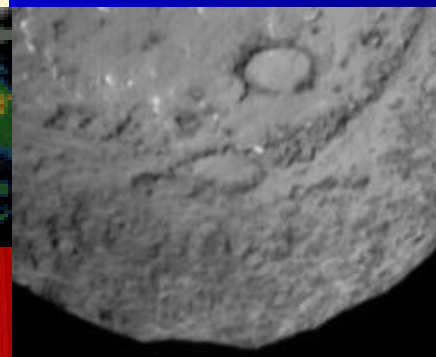
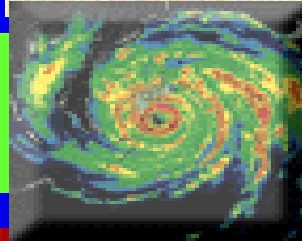
A rumour that 'Face- Scratcher' was on prowl in Biswa Sitapur, UP)

Efforts by NPCIL with Vigyan Prasar

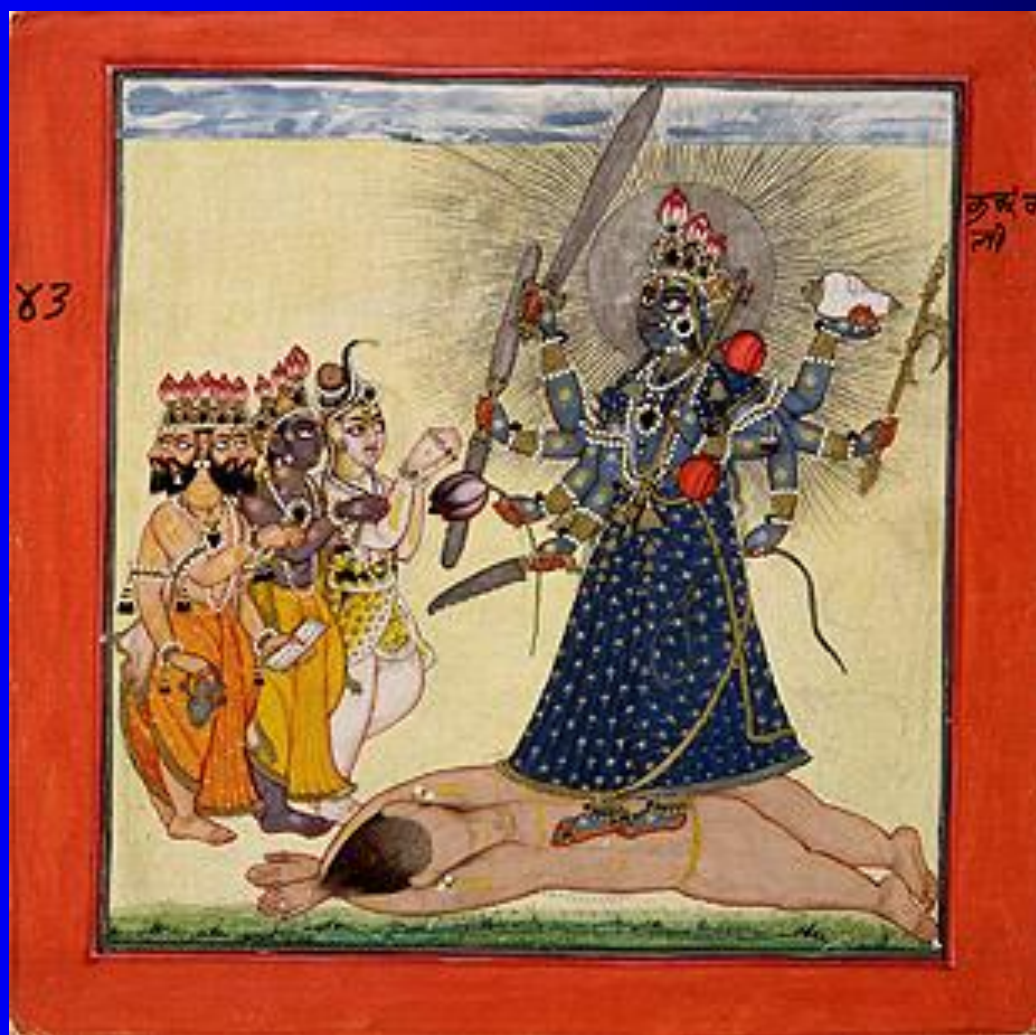
- Books for common people
- Involving students (Quiz, competitions)
- Popular Lectures
- Cartoons
- Poster and ads
- Visits to Nuclear Power Plants
- Popular articles in magazines, souvenirs, newspapers etc.



Thanks



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HAPPY DAY

Kudankulam Problem Resolved!



Operation Muhnochwa

विद्युत सब स्टेशन पर तोड़फोड़ व आगजनी के आरोप में पांच बन्दी

सीतापुर कार्यालय
बिसवां (सीतापुर), 20 जुलाई। यहाँ स्थित विद्युत सब स्टेशन में तोड़फोड़ करने और बाद में आग लगा देने के आरोप में पुलिस ने पांच लोगों को गिरफ्तार किया है। बाद में इन लोगों को जेल भेज दिया गया। जानकारी अनुसार अभी कई अन्य व्यक्तियों की गिरफ्तारी की सम्भावना है।

आज गिरफ्तार किये गये लोगों में धर्मा टोला निवासी फूकन के पुत्र इरफान व राजा का पुत्र पापु, मिस्टरीज निवासी दुर्गा प्रसाद का पुत्र विवेक पाण्डेय, कमगरी टोला निवासी अन्वर का पुत्र अफसर, कैसी टोला निवासी शब्बीर का पुत्र रमीम शामिल हैं।

दूसरी तरफ तोड़फोड़ और आगजनी की

घटना के बाद आज यहाँ विद्युत आपूर्ति नहीं हो सकी।

विद्युत विभाग के अधिकारियों और कर्मचारियों ने बताया कि युद्ध स्तर पर सब स्टेशन को ठीक करने का कार्य जारी है। विद्युत व्यवस्था सामान्य होमकर तक हो पायेगी। गत दिवस विद्युत समस्या को लेकर महिलाओं ने धरना दिया और यहाँ के लोग बाजार बन्द कर सब स्टेशन पर गये। इनमें से कुछ लोगों ने सब स्टेशन के बाहर खड़े याहनों के अलावा सब स्टेशन के अन्दर रखे सामान की तोड़फोड़ की और बाद में आग लगा दी। इस सन्दर्भ में विद्युत विभाग की तरफ से लगभग 1200 व्यक्तियों के खिलाफ रिपोर्ट दर्ज करायी गयी थी।

The Times of India, Lucknow

UTTAR PRADESH

Saturday, August 10, 2002 5

Are laser beams behind *muhnochwa* scare?

TIMES NEWS NETWORK

Allahabad: The *muhnochwa* terror has now come to petrify inhabitants of eastern UP, right from Gaziabad to Allahabad, Varanasi, Aligarh, etc.

Coming out with a probable scientific explanation to the whole issue is Dr H S Goyal, a former fellow of University of Liverpool, UK and presently serving as reader at the Motilal Nehru National Institute of Technology (MNNIT) here.

The physicist, justifying the claims of the affected people scratched by an object which is capable of vanishing in thin air, says that it is out of technical limitations to supplement a remote control device having physical entity with enough energy to accomplish the job.

According to him, it is possible only through well guided laser beams requiring minimum energy to hurt a human while bearing no physical identity which enables it to vanish scot free.

Moreover, reports of *muhnochwa* or spots of red light affecting only the uncovered portions of the human body itself goes to indicate the presence of laser beams guided by temperature sensors for affecting the un-

Injuries are self-inflicted, says SSP

TIMES NEWS NETWORK

Kanpur: Interrogation of alleged victims of the *muhnochwa*, the unidentified flying object, has revealed a different tale which has forced the police to deal strictly with rumour mongers. Both victims of the *muhnochwa* attack revealed that hunger for cheap publicity had caused them to master mind the *muhnochwa* menace. This information was provided by SSP Rajendra Pal Singh.

The SSP Singh said that both cases of the attack in the city had been proved to be false after investigations and mere figments of the imagination. He also added that a

covered portions of human skin.

Goyal further states that attacks are reported in late hours or during power cuts because sun light and electromagnetic rays drastically decrease the particle concentration level in laser beams, rendering its striking

team of IITians and Lucknow scientists were investigating the fact behind the mysterious menace.

Singh said that on the advice of the Sitapur administration around three days ago a team of scientists and technical experts of Birbal Sahani Institute had proved that there was no such object to fear about. The administration has also claimed that there was no such type of mysterious object in the city and rumour mongering by some irresponsible elements had only served to create terror in the city. In Nawabganj and Govindnagar areas the police caught five rumour mongers and after issuing a strict warn-

ing potential ineffectual.

Laser beams, as per the physicist, can even cut steel ropes and electric wires. Referring it to be some kind of laser attack through spying satellites, Goyal further makes his point clear by pointing at the recent

ing released them. The SSP said that it was painful to see people believing in such hoaxes at this stage of social development. The district administration has taken the alleged assaults by the *muhnochwa* in the city very seriously. District magistrate Arvind Kumar said that strict action would be taken against anyone found spreading rumours and creating panic in the city due to this menace.

The SSP claimed that he had asked all police station officials and local investigation units to take strong steps against those causing terror in the city over the *muhnochwa*.

snapping of high tension 33 KW thick steel wire over the Yamuna bridge connecting Rewa Road station to the city.

Notably, the scratch marks as projected by media had no resemblance of human fingers doing the act.

The Hindu Reported..

(Nov 27, 2013)

- The first unit (1000 MWe) of the Kudankulam Nuclear Power Project (KKNPP), is now generating 370 MWe and electricity is being wheeled into the southern grid, according to R.S. Sundar, Site Director, Kudankulam-1 and 2.
- Two Russian reactors, each with a capacity of 1,000 MWe, had been built at the KKNPP in Tirunelveli district of Tamil Nadu.
- The first one, which went critical on July 13, was now stabilising and it would generate its full power in January 2014, he said.
- “We are monitoring all parameters and we are reporting them stage-wise to the regulatory authorities,” he said. Electricity from unit-1 first started flowing into the grid on October 22.

- The second unit would be commissioned in next June or July.
- Dummy fuel were loaded into the second unit a few months ago, Mr. Sundar said.
- Out of 2,000 MWe to be generated from the two units, Tamil Nadu will receive 925 MWe, Karnataka 442 MWe, Kerala 266 MWe and Puducherry 67 MWe. The remaining remains as yet unallocated.
- The two reactors, called VVER-1000 are built by the Nuclear Power Corporation of India Limited (NPCIL). While their original cost was Rs.13,171 crore, the revised cost is Rs.17,270 crore.
- The NPCIL will build two more such reactors at Kudankulam. Officials from the Department of Atomic Energy (DAE) said the third and fourth units would cost more than Rs. 39,000 crore — almost at Rs. 20 crore for a MWe. Fifth and sixth units will also come up at Kudankulam.

Some Efforts

- **Ganesha's statue 'drinking' milk (mid 90's)**
- **Plague (1994)**
- **Total Solar Eclipses (1995, 1999, 2005, 2009)**
- **Alignment of Planets (1995 and 2005)**
- **Muhnochva menace (2002)**
- **Earthquake, Land slide (2004), Tsunami (2004), Hurricane (2005)**
- **Vigyan Rail (2004, 2005, 2008) but locally**
- **Large Hadron Collider**

- **Stem Cell and Longevity Research**
- **Mars invaded by Spirit, Opportunity (2004)**
- **Venus Transit (2004, 2012)**
- **Kudankulam & Nuclear Energy (2012-13)**

Some Major Players

- **Governmental:** RVPSP (NCSTC), NCSM, NISCAIR, Vigyan Prasar, also State councils and now even NPCIL
- **Non-Governmental:** Like NCSTC-Network, KSSP, KRVP, PSNW...
- **Dedicated individuals**

You may realise that..

- People may be drawn to science out of....

Curiosity

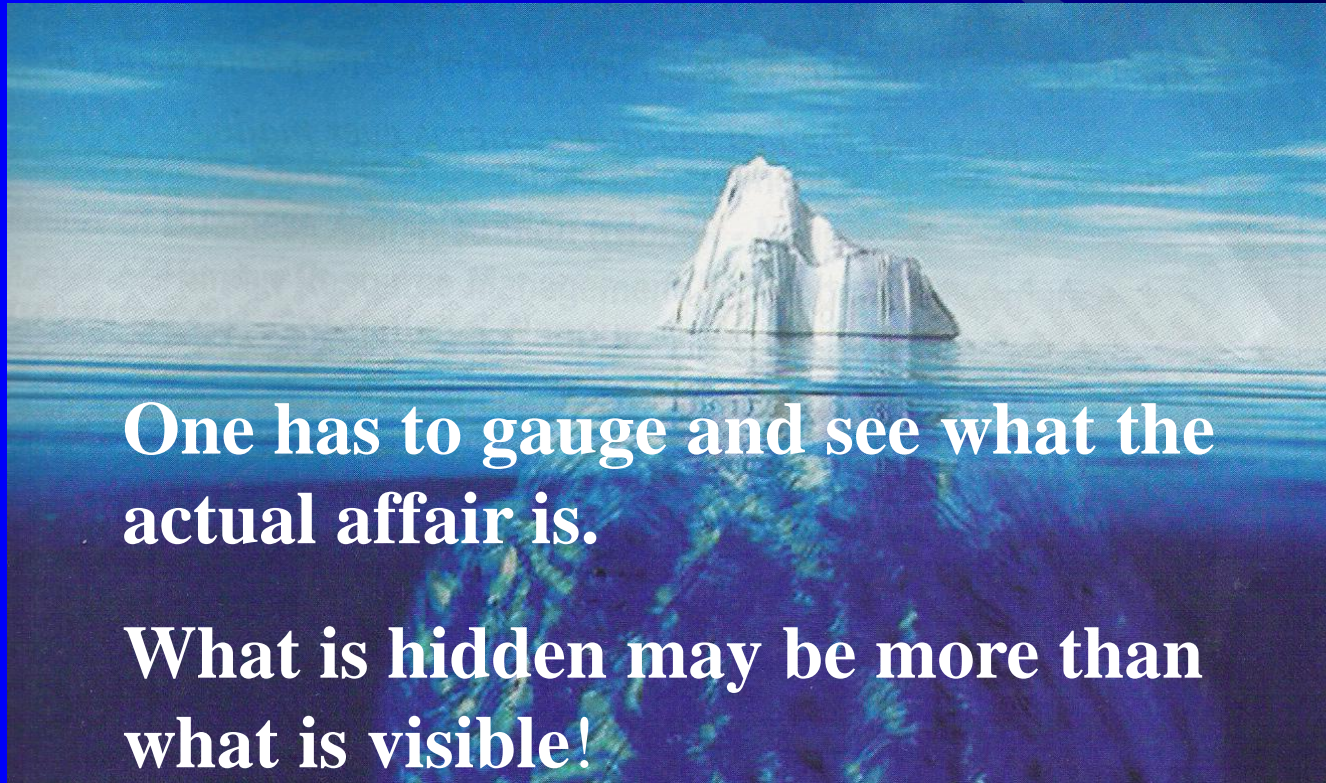


But...



- Isn't it the scientists, activists and media professionals who are supposed to bring about change in the society?

And Afterwards it was quite...



One has to gauge and see what the actual affair is.

What is hidden may be more than what is visible!

Scientific Temperament in Media Professionals

- We are not talking about scientific information base but scientific temper
- You come across both types: Muhnochwa experience was pleasant at the end
- During 1980 and 1995- a hell of difference!
- They are products of this society as are scientists and activists- both succumb to emotions, have their attitudes shaped by societal conditions (ideally the other way)