All India Peoples Science Network

PEOPLE'S SCIENCE

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CONTENTS

EDITORIAL

All India People's Science Network is happy to bring you this issue of 'People's Science' with 'scientific temper' as its central theme. "Scientific temperament is a process of thinking, method of action, a search of truth, way of life, the spirit of a freeman," said Narendra Dabholkar, who was brutally killed by obstructionist forces on August 20, 2013, in Pune. The Peoples Science Movement in India has been observing this day as the "National Scientific Temper Day' since then, a day dedicated to promoting and celebrating the spirit of scientific inquiry and evidence-based reasoning.

One key aspect of 'scientific temper' is evidence-based belief. 'As much belief as there is evidence for" would be a simple, single sentence definition of 'what is scientific temper', says Narendra Dabholkar. He explains it with an example: if you want to go to Armori in Gadchiroli district, you ask for directions from four people. One person tells you a route based on a dream, another based on overheard information, a third based on a friend's experience, and a fourth based on their recent trip.

Now, consider these four scenarios for going to Armori. The least credible is the man who dreamed about visiting Armori six months ago. Slightly more believable is the person who overheard directions at the bus stand. You would have much more confidence in the person whose friend visited Armori but still with some doubts. The most believable is the person who visited Armori by a specific route. We would likely trust the fourth person in comparison to the other three. This principle of 'as much belief, as there is evidence for it', is at the core of the 'Scientific attitude'. This is a simple example of 'evidence based decision making'.

As Gauhar Raza points out in this bulletin issue, the phrase 'scientific temper' was used, nearly in the sense used by Pt Jawaharlal Nehru, during the last decades of the 19th century. Yet, it is a notion that was seen as an essential feature of the dream of a 'New India' of various streams of Indian national struggle from Baghat Singh to Subash Bose, Sardar Patel, Maulana Azad, Gandhi to Nehru and became part of the national ethos and popular discourse in newly Independent India. This worldview, as rightly pointed out by Raza, drew upon the rich heritage of reason, evidence-based argumentation and materialistic philosophies of Indian culture, as well as the knowledge of the universe, evolution and the relationship between humans and nature that was being discovered by modern science.

In his essay, he points out the danger looming large. The statements and actions of present political leadership are 'seemingly harmless, irrational, at times laughable statements', such as the cow is the only animal that inhales carbon dioxide and exhales oxygen. 'Such statements made in

public by the political leadership are not mere slip-ups', says Raza and adds, 'They constitute the bedrock of religious nationalism, on which fundamentalist organisations are formed.' These statements, while seemingly harmless, contribute to the erosion of scientific temper in our society.

In another essay in this volume, Raghunandan elaborates on the challenges of scientific temper in the current context. He notes that fake claims like Vedic-Sanskritic Hindu traditions of the past had knowledge at par with modern science and technology and equating mythological iconography of god Ganesha as evidence of advanced cosmetic surgery and the mythical "pushpak vimana," as evidence of inter-planetary travel and so on undermine scientific temper by disregarding the need for concrete evidence and promote acceptance of faith-based beliefs, myths and supposition as substitutes. He argues that 'To counter such narratives, the PSM should go beyond merely stating that they are incorrect, but argue convincingly as to why they cannot be correct, giving supporting evidence to that effect. While doing so, the PSM should salute and respect the correct and advanced knowledge developed in ancient or medieval times.'

The Declaration and Resolution on Scientific Temper adopted by the Peoples Science Movements in India on 28th Feb 2024 at Kolkata says "There is an urgent need for a renewed commitment to evidence-based reasoning, critical thinking and a scientific approach in India, especially amidst growing socio-political movements that challenge a scientific temper and universal knowledge production based on commonly agreed methods and understanding" and calls for "action across three fronts: the State's role, the involvement of scientific and academic institutions, and combating the undermining of science by the State, the erosion of academic freedom, and the spread of pseudo-science and unscientific beliefs. We urge scientists, intellectuals, and other like-minded individuals to support evidence-based thinking and policy-making and to uphold constitutional values to foster a scientific temper." The time has come for every PSM organisation and activists associated with it to vigorously act to implement the Kolkata declaration on scientific temper.

SCIENTIFIC TEMPER: THE JOURNEY OF A NATION

Gauhar Raza

The phrase 'scientific temper', many think, was invented by Pt Jawaharlal Nehru. Dr PVS Kumar in a 'literature hunt' found that it was used in a few articles in England during the last decade of the 19th century. However, it did not gain currency in literature at that time and was seldom used in the discourses related to science communication or science and the public. Even if Nehru was not the inventor of the term, there is no doubt that in India it was he who defined 'scientific temper' (ST) in his book Discovery of India. He also used the idea of ST extensively in his speeches and popularised it to the extent that it became part of the popular discourse at least in India.

NEHRU AND SCIENTIFIC TEMPER

Nehru started writing Discovery of India in 1945, when he was in jail. The first 582-page edition was published in 1946. The 'Special Centenary Edition', carries a note at the end of the book: *'(the book) unfolds the panorama of India's past and seeks to analyse the sources and strength of India's national personality and how she fits into the modern world'*. The book deals with the history, philosophy, and culture of India. Some experts say that it is a book based on Nehru's personal experience and understanding of present, past and future. RSS demagogues go to the extent of saying that it is a book which reflects understanding of Indian civilization of a highly westernised Nehru. But by no stretch of imagination, it could be categorised as a book on science or even popular science. Then the question arises why it did become so important for scientists and the future of science in India.

Before we deal with the above question let us look at the book slightly keenly. About five pages of the book is devoted to 'Religion, Philosophy, and Science'. Here Nehru specifically deals with science and scientific temper. However, if we look at this 582-page book he uses terms 'Science (70 references)' 'Scientific (34 references)', 'Scientists (11 references)' and 'Technology & Technological (15 references)' interspersed throughout the book. When Nehru was writing this book he was a

middle-aged politician who, during his education in London, had studied elementary science while studying tripos. After his graduation (in 1910) he gave up science to pursue law. According to his own admission 'I have a partiality for the literary aspects of education and I admire the classics'. Obviously, he was not a scientist yet he comes up with the idea of scientific temper and provides a remarkable definition of scientific temper:

> *"It is the scientific approach, the adventurous and yet critical temper of science, the search for truth and new knowledge, the refusal to accept anything without testing and trial, the capacity to change previous conclusions in the face of new evidence, the reliance on observed facts and not on pre-conceived theory, the hard discipline of the mind—all this is necessary, not merely for the application of science but for life itself and the solution of its many problems." (Discovery of India, pp..)*

He warns 'Too many scientists today, who swear by science, forget all about it outside their particular spheres.' He also proposed that basic scientific training is essential for every student to 'understand and fit into the modern world and develop'. Even before India got its independence, Nehru quite clearly asserted that building scientific institutions must be an essential part of planning. So that generations of scientists are able to contribute to the development of the country, after independence. He also lamented the lack of scientific temper among his own fellow political leaders.

He is also conscious of the fact that there are domains science does not touch:

> *"But even when we go to the regions beyond the reach of the scientific method and visit the mountain tops where philosophy dwells and high emotions fill us, or gaze at the immensity beyond, that approach and temper are still necessary."*

However, Nehru was not alone in realising the significance of scientific temper in a free India. Even before independence there was a common understanding among the scientific community that scientific temper has to be established. When HJ Bhabha wrote a letter to Tata requesting him to establish Tata Institute of Fundamental Research, he emphasised on the need for a large number of trained scientists in post-independence India, working on the frontiers of science.

After cursorily examining Nehru's definition of scientific temper let us ask a difficult question, how come a middle aged politician who by no stretch of imagination

was ever trained as a scientist and as per his own admission had a preferential leaning towards literature vis-a-vis science, is able to articulate his ideas about science, scientists attitude, scientific temper, and their relationship with the future development of a nation which was yet to throw away its yoke of slavery! Let us also remember that Nehru was the second most important politician by now and the country was politically in turmoil at the cusp of a big national change which had serious international implications. In those turbulent times how could a politician decide to write a book with little access to reference material in the jail. And the book turns out to be intellectually so rich.

The simple answer to this question probably is that the leadership of that period—including Gandhi, Sardar Patel and Maulana Azad and most other political leaders—was groomed among the best of the minds of that era. They were well educated, were well versed in classics and continued to interact with the top-notch intellectuals of that period. There was mutual respect between the intellectual leaders working in different domains and the political leaders. Let me cite just two examples here. One where Tagore vehemently disagreed with Gandhi when the later commented that the earthquake in Bihar was a God's curse. The other is the exchange of letters between Gandhi and Einstein. In the first incident, both Tagore and Gandhi disagreed with each other. There was a long debate but there was no bitterness or accusations. In the exchange of letters Einstein was all admiration and respectful towards Gandhi. Political leadership of that time was not only aware of the remarkable work of intellectuals working in different fields but also respected them. The intellectuals, at the same time, admired the sacrifices political leadership was making to defeat all powerful imperialism.

In India, the debate on 'scientific method', 'scientific world view', 'scientific thinking', 'scientific thoughts' and 'scientific ways of doing things' started in the 19th century. With printing and translation of books in Indian languages the discourse became intense. Gradually, a community of Indian scientists emerged who, besides contributing to the international pool of scientific knowledge, soon started writing popular books, articles and giving public lectures on modern scientific ideas. However, this debate was confined within a very small class of elites which was expanding with time but due to high levels of illiteracy it still remained insignificantly small.

By the turn of the 20th century, the freedom movement started gaining momentum and gradually became the most effective and potent channel of modern

ideas. The close relationship between the scientific community and political leadership emerged and many leading scientists participated in the freedom movement. Poets, writers, artists, musicians and even filmmakers, in short, the most brilliant minds not only contributed to the freedom movement but also developed personal association with the political leaders. This relationship over a period of time cemented and as a result Nehru was elected the president of 39th Indian Science Congress in January 1947. He delivered the presidential address titled 'Science in the Service of the Nation'.

Independent India's First Prime Minister Pandit Jawaharlal Nehru was the elected the President of Indian Science Congress in January 1947

After independence the chapter on Religion, Philosophy and Science of the Discovery of India, (Ch 10, section 9) became a *Holy Grail* for many, because Nehru was elected as the first Prime Minister of India. Scientists, science communicators, educationists, planners, and even the emerging corporate sector saw an opportunity in broadening the base of science dissemination efforts. There was a national consensus which led to an intense debate on building scientific institutions, communicating science to the public and enlarging the base of teaching modern science in schools, colleges and universities. This along with fund allocation, led to fast industrial growth as has been pointed out by Chandra, B et al. (1999) in their celebrated book 'India Since Independence'. For example, in the 1950, India met 89.8 per cent of its needs for even machine tools through import. In contrast to this, the share of imported equipment in total fixed investment in the form of equipment in India had come down to 43 per cent in 1960 and mere 9 per cent in 1974. Whenever Nehru inaugurated any

scientific institution, he always emphasised the need to spread scientific temper among both, the public and the scientific community. He also never left an opportunity to interact with scientists. Nehru wrote his speeches and could interact with scientists with ease because, as pointed out above, his political life was groomed among the best of the minds who were working on the frontiers of science. To name a few he had personal relationships with CV Raman, MN Saha, SN Bose, SS Bhatnagar, HJ Bhabha, Mahalanobis, KS Krishnan, etc. The mutual respect and regular interaction continued even after he became the prime minister.

I have taken a long route to make a point that a politician like Nehru could talk about science and popularise the notion of scientific temper with ease for two reasons. Firstly they were groomed among the best of the minds of that time and secondly because of the leadership of the freedom movement. Specifically, Nehru had realised that the spreading scientific temper is not only 'science communication' or 'science teaching' or just 'building scientific institutions', it is a much bigger national project. Of course, dissemination of scientific facts, data and tenets is the bedrock of this national mission but it is essentially a cultural and a political project.

IDEAS OF RATIONALITY, MATERIALISM AND EXPERIMENTATION WERE ALWAYS PART OF DISCOURSE IN INDIAN HISTORRY

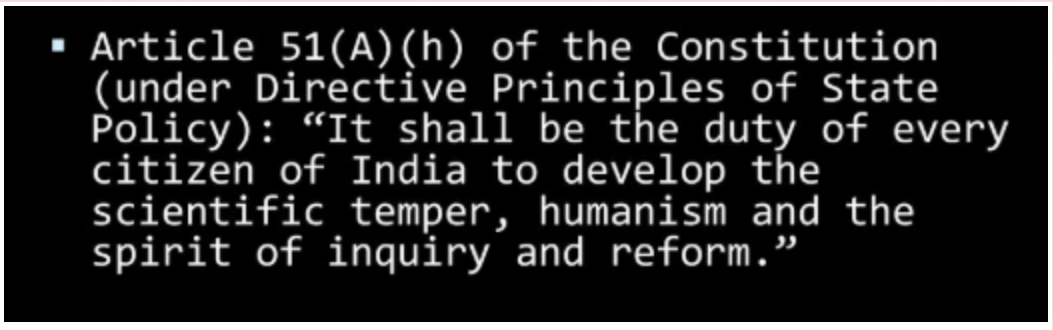
The ideas of rationality and proto forms of materialism were always part of the debate in Indian culture, philosophy and even religious thoughts. The *Charvak* school of thought propagated materialism and went to the extent of saying that religion is a creation of the powerful and cunning to exploit the weak. Nehru's definition quoted above is quite close to what Buddha had said centuries ago:

> *"Do not believe in anything simply because you have heard it. Do not believe in anything simply because it is spoken and rumoured by many. Do not believe in anything simply because it is found written in your religious books. Do not believe in anything merely on the authority of your teachers and elders. Do not believe in traditions because they have been handed down for many generations. But after observation and analysis, when you find that anything agrees with reason and is conducive to the good and benefit of one and all, then accept it and live up to it."*

Even *Rig Veda* has a *shloka* which while questioning who created this cosmos says that 'even those who created it may not know the answer'. Many more examples

could be cited, however we must not forget that over the centuries social structures were built based on myths, superstitions and the most oppressive caste system justified by the Brahmanical philosophy and its codified text.

These ideas in their proto forms were distilled and crystallised in filtration plants of political and philosophical debates created by the scientific and industrial revolution of Europe. When they came back to various parts of the world they often collided with the existing social structures and belief systems. Some of these got transformed as well. For example, the meaning of the word secular was completely changed in the Indian context. In the Webster dictionary 'secular' is primarily used to distinguish something (such as an attitude, belief, or position) that is not specifically religious or sectarian in nature. In Indian context it means respect for all religions, especially Hindu-Muslim unity. Therefore, instead of a 'secular value system' in India the term 'scientific temper' was popularised.



PRESENT TIMES

Some remarkable events have happened since Independence. India became the first country to unanimously pass a Scientific Policy Resolution in 1958. In 1976, the Indian Constitution was amended to include 'spreading scientific temper, humanism and spirit of inquiry and reform' as one of the fundamental duties of every citizen. In 1981, intellectuals issued the first Scientific Temper Statement'. In 1987 Jan Vigyan Jatha was organised, which gave birth to the literacy movement in the country. In 2011 Palampur Declaration was issued. And in 2024, People's Science Movement passed the most comprehensive and widely discussed statement on scientific temper. This does not mean that the anti-science religio-fascist forces were sitting idle.

'By the late 1980s, anti-science Hindu right-wing forces had also enlarged their politico-religious bases and turned violent. They mobilised Hindu rightists to demolish

a mosque. A large number of Hindu 'god-men' had established ashrams (places for worship, sermons or other religious activities) and amassed enormous wealth, and their mass following had increased exponentially. By 1999, when the first Indian Government led by the right wing was formed, the nexus between the right-wing political leaders and the god-men had been cemented. In 2014, a second right-wing government came to power when Narendra Modi led by Bharatiya Janata Party (BJP) took office. Since then, more than ten years have passed. Since then a number of anti-science statements have been made by those in power.

Let us probe the relationship between seemingly harmless, irrational, at times laughable statements made by the political leadership and a far more serious onslaught on scientific rationality. The nexus between right-wing political forces and violent religious organizations makes science communication a life-threatening project in India and anti-science religious statements by political leaders translated into policies, invaded scientific spaces and affected scientific output.

Soon after Modi became the Prime Minister, he addressed a gathering of medical experts in Mumbai. The meeting set the government's ideological agenda, deciding how science and scientific knowledge were going to be treated in the years to come. Modi said that Lord *Ganesha* is the proof that we had mastered the science of plastic surgery in ancient India. He also remarked that the birth of *Karna* is evidence that we practised reproductive genetics thousands of years ago. *Ganesha*, with an elephant's head mounted on a human body, is one of the most popular gods in India. Clearly, there were two messages in his statement. First, from now on, Hindu religion would be mixed with scientific facts; and second, the boundary lines between science and myths and superstitious beliefs would blur. The speech was a frontal attack on the scientific temper.

On the one hand, this was a loud and clear signal to the policymakers that in times to come they would have to work to change the nature of science and technology syllabi and science communication (Vijetha, 2016). Emphasis would be to spread myths and superstitions with impunity, and projects that aim to spread the scientific temper would be withdrawn. The statement was also an instruction to funding agencies to support projects that ratify myths and superstitions and establish causal relationships between scientific facts and mythical stories. On the other hand, it was also a ratification, instigation, encouragement and approval of past and future

outrageous anti-science statements by ministers, members of parliaments, party leaders, bureaucrats, media channels and even judges.

When a prime minister, completely disregarding historical and scientific scholarship, precision and correctness, makes such statements repeatedly, they translate into a policy that encourages the spreading of myths and superstitions to suit the political agenda. Since then the list of Modi's repeated attacks on science has grown very long.

Taking their cue from the Prime Minister, ministers and chief ministers of his party have gone much further. One of the ministers issued the statement that the *Vedas* (ancient texts) had revealed the 'laws of motion' long before Newton (The Times of India, 2018). The same minister publicly denounced Darwin's theory of evolution and said that no one had ever seen a monkey transforming into a human being. *Business Standard* reported that 'earlier this year, Rajasthan's education minister (no less), Vasudev Devnani had given another "scientific" theory when he claimed that the cow was the only animal that inhaled and exhaled oxygen. The same claims were repeated by a Rajasthan High Court Judge as well.

ARE THESE STATEMENTS HARMLESS MISTAKES?

Such statements made in public by the political leadership are not slip-ups. Each one is well thought out and appeals to right-wing religious nationalists' anti-rationalist and anti-science consciousness. A scientist may laugh at such assertions, rejecting them as idiotic attacks on the scientific temper and rationality, but they are not naive statements made by mistake. They constitute the bedrock of religious nationalism, on which fundamentalist organizations are formed.

The present fascist political leadership has been groomed in Ashrams of Baba's and RSS Shakhas. Such an environment by its very nature cannot produce Gandhis, Nehrus, Patels and Azads of today who would vote and support scientific temper.

In these times the responsibility of defending scientific temper and scientific institutes lies on secular, left forces and concerned citizens of India. They have to take head on struggle against these forces in times to come and chalk out strategies to win the battle of ideas. We have to remember that the transmitter model of science communication will not work unless it is a cultural and political project.

ASSAULT ON SCIENTIFIC TEMPER: A SYSTEMIC (ढांचागत) PROLEM

D. Raghunandan

The past nine years have seen numerous efforts by top government ministers and officials to undermine scientific temper. Endeavours are being made to promote mythology as science. A fake manufactured narrative of a mythical past is being aggressively pushed to prove that ancient Vedic-Hindu knowledge preceded, and indeed surpassed, all knowledge from all other civilizations and cultures. This kind of propaganda does great disservice to the many real, major achievements in ancient India, which may come under suspicion due to this cloud of untruths and exaggeration. A distorted and communalized history, and a falsely unified or singular orthodox, traditionalist "Hindi-Hindu-Hindustan" culture, is sought to be foisted upon this vast country, whose diversity lies at the very heart of its Constitution and nationhood. This fake narrative is now also sought to be spread through the school and higher education systems , aiming to cement these revanchist (विद्रोही) and jingoist (अंधराष्ट्रवादी) ideas in young minds, jeopardizing the future of this country. Critics of these trends are viciously attacked as anti-national, westernized, and products of "colonized minds," including by an organized army of trolls and often also through physical violence.

Scientific temper is also undermined when the government itself denies or falsifies independent research findings even if they use official data, thus suppressing critical examination of data and policies, and devaluing evidence-based reasoning itself. Leading scientists and technologists have expressed concern that, for the first time since Independence, they are nowadays not consulted for policy-making. We have experienced during demonetization and the Covid-19 pandemic that arbitrary decisions have been taken with haste without any consultation with evidence-based expert opinion.

India needs considerable investment in Research & Development to enable self-reliant development in the present knowledge era. However, the sector is suffering from severe budget cuts, and is now at a new low of under 0.7% of GDP compared to a world average of 1.8%. Instead, funding is being diverted towards

pseudo-scientific "research" on cow products and their unproved medical remedies; on various superstitious beliefs, spurious and manufactured history, and biased unscientific pro-government interpretations of selective developmental data. India is also lagging far behind many developing countries in East Asia in skill development. Only 4.7% workers in India are having any formal training compared with 68% in the UK, 80% in Japan and 96% in South Korea. In an economy that is increasingly dependent on import of technologies, India's arduously built S&T capabilities are being steadily eroded, hampering India's inclusive development and ascent up the international value-chain.

Thus, the defence and promotion of scientific temper in the current juncture is a battle that requires to be fought on many fronts. There is a systemic assault on evidence-based reasoning, pluralism, freedom of thought and reduced role for S&T hampering inclusive self-reliant development. The movement to promote scientific temper must now move beyond disproving superstitions or engaging in enlightened science communication. Even though these continue to be important, these require newer or additional dimensions to promote critical thinking and evidence-based reasoning.

CONTEMPORARY CHALLENGES:

Many statements have been made since 2014 by Government Ministers, including the Prime Minister himself, on ancient India (by which is actually meant Vedic-Sanskritic Hindu traditions) possessing, several thousand years ago, knowledge at par with contemporary science and technology (S&T). Advanced cosmetic surgery as evidenced by the god *Ganesha* having an elephant's head fitting perfectly on a human body, or inter-planetary travel using the mythical "*pushpak vimana*," internet in the times of the Mahabharata are some prominent examples.

All these exaggerated or outrightly false claims are built upon a slim foundation of some original statements or hypotheses extended through illogical leaps of imagination to theories never intended by the original authors. For instance, Bhaskara II (c. 8th Century CE) is often quoted as saying "the Earth has an attractive power which draws heavy objects to itself… so objects located at lower parts or at the sides do not fall" from its surface, as proof that he knew about gravity. However, in science 'gravity' is much more than objects coming down on earth. It explains gravitation as a force defined as a function of the masses of two objects and the distance between them.

This is backed by a concrete mathematical expression, rather than a vague statement. While these claims cater to the poorly-informed but growing "India is *Viswaguru*" jingoism within the country, this makes India a laughing stock among the scientific community at large. It also damages India's reputation of some major scientific achievements within different intellectual traditions of ancient and mediaeval era. Further, such claims undermine scientific temper by disregarding the need for concrete evidence and promote acceptance of faith-based beliefs, myths and supposition as substitutes.

While such comments continue being made sporadically, there is a new focus on institutionalization (संस्थागतकरण) of such beliefs. For example, courses on traditional Indian knowledge systems have now been made compulsory under the NEP in universities/colleges. An online national "cow science" exam, the Kamdhenu Gau Vigyan Prachar Prasar Exam, was announced in 2021. The UGC wrote to 900 universities to "encourage" students to take the examination! More than 5 lakh students registered for the exam. The Rashtriya Kamdhenu Aayog under the Ministry of Animal Husbandry, Fisheries and Dairying prepared the study material. The exam was postponed after much controversy and protest. A calendar has been published by the Centre for Indian Knowledge Systems at IIT-Kharagpur giving distorted views of science in ancient India, even if in a more sophisticated and supposedly academic manner.

To counter such narratives, the PSM should go beyond merely stating that they are incorrect, but argue convincingly as to why they cannot be correct, giving supporting evidence to that effect. While doing so, the PSM should salute and respect the correct and advanced knowledge developed in ancient or medieval times. Aryabhata's calculations of the tilt of the Earth's axis, value of pi (π), trigonometry, calculus etc, or techniques for making pure iron or the famous Wootz steel are examples of such discoveries. The PSM should also point to what, if any, were the limitations of ancient knowledge, such as why artisanal Indian iron and steel-making could not compete with factory-based iron and steel production in the UK. Mocking the fantastic claims about science in ancient India may please some audiences, but are

likely to alienate many who may wonder why we are so prejudiced against ancient Indian achievements.

As part of these institutionalized efforts, a shocking assault has been launched on science, and on critical thinking, in the school system too. Revisions in NCERT text books remain a glaring example of such effort. The theory of Evolution has been dropped from Class X books, including even a Box item on Charles Darwin. According to Hindutva spokespersons, including Ministers, the *dashavatara* is a better theory! The name of Pythagoras has been dropped from the theory which usually bears his name because of the debatable claim that ancient scholar Boudhayana had discovered the theorem first, although nobody has even claimed that he worked out a proof.

Among the wider public, Hindutva forces have been actively spreading superstition, pseudo-science, belief in mythology as actual history, and false narratives about a (constructed) unitary "*Sanatani*" Hindu religion and practices. (there being many disagreements about what *sanatana dharma* really refers to) along with prejudice against Muslims and other minorities based on false stereotypes and propaganda. During the Covid-19 pandemic, notorious whisper campaigns were propagated by Hindutva outfits to "ward off" the virus, such as turning one's face to the sun (likened to *surya namaskar*), drinking warm water, ladies performing *aarti* daily at the local temple and marking their doors with the *aarti* water (which also marked out non-Hindu households) etc. A social media campaign was conducted against Muslim vegetable vendors for "deliberately" spreading Covid by spitting on their produce.

A multi-millionaire yoga guru was allowed to peddle his "ayurvedic" products as "cures" for Covid-19 over many months, before strong protests by doctors and science groups finally stopped him from. Many spokespersons of Hindutvavadi forces defended him with false equivalence between proven scientific treatments and "traditional" remedies. The PM himself exhorted people to come out on balconies, light candles or lamps, and clang vessels to drive away the Corona virus. Right wing trolls falsely proclaimed widely that "NASA had proved" the efficacy of this collective activity by "recording their radiations"from space! Even results of mandatory third-phase trials to show the efficacy of a particular Covid vaccine were never made public by the Government, which put national pride ahead of science and damaged India's reputation among the international scientific community.

Vegetarianism is yet another false attribute of "true" (upper-caste) Hindu values touted by *Hindutvavadi* forces. This despite the People of India Survey by the Anthropological Survey of India finding that 88% of communities in India were non-vegetarian! So IITs were forced to stop serving meat in its messes, whole cities were declared vegetarian. A display depicting food habits of the Indus Valley Civilization built around findings from archaeological digs showing animal bones were pulled down and a fake vegetarian diet got displayed as demanded by Hindutva forces backed by Government Ministers!

All these are not only part of an effort at imposing a unitary Hindutva world view and socio-cultural norms upon the diverse peoples of India, but also a deliberate effort to chip away at a scientific approach and instead push people to following pseudo-scientific advice and superstitions spread by Hindutva forces as the accepted authority!

It has now become routine for Government spokespersons and allied forces to typecaste all critics as "anti-national" forces who do not want the country to progress. All sorts of methods are being used to intimidate, browbeat and shut down any criticism and pluralism of thought and opinion. Physical assaults inside universities, IITs and public gatherings have become common. Hindutva outfits linked to the ruling dispensation have imposed their own censorship on books, poetry, music, films, food habits etc and frequently disrupted public performances and events. Communal rabble-rousing linked to violence and riots, lynchings, and hate-speech against minorities, secularists and civil society activists are all part of planned intimidation (डराना-धमकाना) towards total dominance. This atmosphere of hatred, intolerance, and aggression has created an environment of violence not only against criticism but also specifically against science, reason and critical thinking, as manifested in the planned murders of Narendra Dabholkar, Govind Pansare, M.M.Kalburgi and Gauri Lankesh. Nowadays, media persons, students and activists are being harassed and imprisoned on trumped-up charges, and individual or institutional critics are being raided by the "caged parrots" of the ED, CBI, IT and other agencies.

The AIPSN needs to resist all these concerted efforts to undermine Scientific Temper through resolute and innovative campaigns among the masses.

CAMPAIGN ON SCIENTIFIC TEMPER: VOICES FROM THE STATES

Considering the situation the country was in due to the blatant disregard for scientific temper by the government and its social forces, it was decided to start a national campaign on Scientific Temper which would culminate in the year 2024 as a way forward.

The process was initiated at a National brainstorming meeting which was held on 6th August, 2023, at India Habitat centre of National foundation for India. 16 members participated in that meeting and discussed a paper byArunabha Misra along these lines. A module preparation workshop and the meeting for the discussion on new declaration was held in Hyderabad from 15 to 17th September, 2023. In Hyderabad, the note on thrust areas of our campaign was discussed in depth and finalised by making it simple and easily understandable avoiding hard English. The hindi translation was also prepared.

Two successive training workshops organised by Haryana Gyan Vigyan Samiti (HGVS) were held in Rohtak and Kankinara. At Rohtak 61 participants from 10 Hindi speaking states excluding Chhattisgarh participated in their workshop on 11-12th October,2023. A workshop in Kankinada was organised by Jana Vigyan Vedika (JVV), Andhra Pradesh, and except Maharashtra and Puducherry, all non hindi speaking states joined that. Altogether 81 participated in this workshop on 15-16 October from 9 states (1 from Assam, 2 from MP). A similar workshop for North-eastern states was held later in November.

Two day Training Workshop in Kakinada

7th November on the birthday of Marie Curie and C V Raman. The Nationwide Campaign on Scientific Temper was launched with a series of press conferences, press releases and release of posters. On that day press conferences were held by JVV Telengana, JVV AP along with a number of programmes in several schools and colleges. Bharat Gyan Vigyan Samiti (BGVS) Jharkhand had a press meet at Koderma, and released the poster there. TamilNadu Science Forum (TNSF) organised an online talk of Narendra Naik, President Federation of Indian Nationalists Association (FIRA), on that day. In Bihar the launching programme was held at Buddha Smriti Park near Patna Station at 3pm. PSM coordination committee of Assam held their press conference on 6th November at Guwahati press club. Paschim Banga Vigyan Mancha (PBVM) had a press meet at Kolkata and released a press statement and the posters of the campaign. Himachal GVS had a press meet and announced 450 panchayat level activity during the period. GVS Haiyana organised a press meet and committed to hold programs in 100 villages and 100 schools.

As part of the culmination of a year-long Campaign on Scientific Temper, a National Convention on the Declaration of Scientific Temper was held in Maulali, Kolkata on 28th February, 2024 . The Scientific Temper Declaration was released and the States shared their experiences during the campaign. Some of these are given here.

CULMINATION OF THE CAMPAIGN FOR SCIENTIFIC TEMPER & NATIONAL CONVENTION ON THE DECLARATION OF SCIENTIFIC TEMPER

(Report prepared by Rahul Bhattacharya and Nandan Bhattacharya. Photo courtesy: Sri Satya Narayan Singh)

As the culmination of a year-long Campaign on Scientific Temper, a National Convention on the Declaration of Scientific Temper was held in Maulali, Kolkata on 28th February, 2024. The one-day Convention began with a cultural performance by PBVM. The welcome address was delivered by Prof. Satyajit Chakraborty and the first session was moderated by Dr. Parthib Basu.

Dr. Arunabha Misra, Convener, Scientific Temper Desk, shared the objective of the programme by highlighting the need for scientific temper and the role of the state. Dr. Misra expressed concern about pseudo-science and its current popularity. Scientific approaches and evidence-based reasoning were suggested to counter pseudoscience. Dr. Misra said that fragmented scientific study was being used to promote the idea that ancient Indian knowledge was unquestionably superior while downplaying the role of other civilisations. The fundamental study of science, however, is neglected. Dr. Misra stressed the importance of preserving the country's democratic fabric and culture.

Dance drama is being performed at the National Convention in Kolkata

Prof. Swapan K Pramanik, President, Asiatic Society speech pointed out the necessity of a new declaration to stop propaganda towards anti-scientific temperament. He reminded the audience that in 1976 the word "scientific temper" was first amended in the Indian Constitution. It was pledged that we the citizens of India would follow the path of scientific temper. However, in recent times an attempt to recreate our history by spreading false propaganda without substantial ground is being witnessed. Systematic attempts to destroy scientific temperament and promote state-controlled forums are being observed. The Science Congress which was scheduled to be held in 2021 has been postponed indefinitely.

Release of the AIPSN calendar was done by Prof. Swapan K Pramanik.

Asha Mishra, the General Secretary of AIPSN, spoke about citizens' duty to promote scientific temperament and equality. She advocated for everyone to have access to knowledge. The importance of movement to mitigate attacks on caste and secularism was highlighted. As the speaker pointed out, it is also vital to pay attention to anti-superstitions.

She shared that to counter anti-scientific propaganda, AIPSN connected with people through various means during the period between the 7th and the 28th of February, 2024. It has been accomplished through science fairs, exhibitions, science calendars, cultural activities, posters, slideshows, miracle exposures, and social media campaigns. Through these activities, 22 states, 250 districts, 7000 villages, and approximately 12,00,000 people were impacted.

Part of the delegation at the Kolkata convention

SEVERAL STATES SHARED THEIR CAMPAIGN EXPERIENCES

BENGAL

Along with 'Science for Democracy' and 'Science for Secularism' PBVM added three more slogans for the campaign – a) Science for life and livelihood, b) Propagation of Rationality and Free thinking, c) Right to water, land, forest and energy. PBVM organised 5 relay cycle rallies through all 22 districts along with science festivals and other activities in different regions. The month of December 2023 was used for preparation and District level and Block level workshops/meetings. Various campaign materials were distributed to the district committees such as Campaign leaflets, Folder Posters, presentations on Darwin, Scientific Temper, National campaign on Scientific Temper.

TAMIL NADU

As part of the nation-wide programme, a campaign in 2000 villages in Tamil Nadu were conducted. Activities including anti-superstition programs in schools, science lectures and dissemination through TV, state level workshops, lectures on human evolution, posters, slide shows etc were also done.

ANDHRA PRADESHI

In tandem with this campaign, JVV AP organised four workshops and state-level seminars. Around 38000 direct participants and 4 lakh online participants were reached through different programs. Also, book festivals and book publications were held throughout the year.

NAGALAND

There were workshops at the state level and other events such as sports, painting competitions and scientific talks.

HARYANA

Thirty science fairs were organised in schools and colleges. Other activities like book translation, book publishing, and wall painting were carried out.

MADHYA PRADESH

Various activities were taken up at the district and village levels using different forms.

Prof. P Rajamanickam in his deliberations expressed concerns about pseudo-science and unscientific beliefs. Several recent amendment bills have been introduced , he alleged, which are assaults to scientific tempers. In recognition of February 28's importance, he suggested February 28 be recognized as "National Scientific Temperament Day". He stated that scientific temper will ultimately lead to policy change in favour of peopleKomal Shrivastava, Vice President AIPSN, closed the session by emphasising the importance of listening to young people. She also encouraged more women's participation in the programs.

The session ended with a closing song and vote of thanks by Professor Pradeep Mohapatra.

SESSION 2: CONVENTION ON THE DECLARATION OF SCIENTIFIC TEMPER

The 2nd session of the day was moderated by Dr. Biplab Ghosh with a welcome address from Prof. Mohana.

In her welcome address, Prof. Mohana appealed to eradicate pseudo-science and promote equality and diversity. She cautioned the audience that the government is

planting seeds of pseudoscience in people's minds. The government is putting a different narrative before us based on fiction like plastic surgery in ancient India. The speaker recalled CV Raman as the only Indian to receive the Nobel prize for science.

The Chief Guest was Prof. Asoke Nath Basu, former Vice Chancellor, Jadavpur University, Kolkata. Professor Basu began his speech by supporting the newly drafted declaration to promote scientific temper. He reminded the audience about article 51A(h) in the Indian Constitution, which provides the right to all Indian citizens to develop a scientific temperament.

He urged the audience to be aware of reality. He pointed out that a survey conducted in 2007 showed that a significant percentage of scientists in India still believe in superstitions. Universities are encouraged to offer astrology courses by the UGC. Recently at IISWBM, a proposal to start a PhD course on spiritual management was observed. Thankfully the proposal was rejected by Calcutta University.

In his speech, the speaker recalled Narendra Dabholkar, CV Raman, and S.N. Bose and their vital role in Indian science and society. Citing a few recent positive decisions from institutions such as UGC which has recently taken action to promote education in mother tongues, he argued that to develop a scientific temper and to take science to the people, science must be taught in mother tongue. He also suggested translating the draft declaration into 14 languages. He also welcomed the decision to translate the Supreme Court's verdicts into Indian languages.

Arunabha Misra, Convener, Scientific Temper Desk discussed the process of preparing the draft declaration where people working in this field debated and drafted a new declaration. He said that the government is currently promoting anti-science directly. Furthermore, a corporate, communal anti-science network is at work. In the new declaration, Ambedkar and Narendra Dabholkar's contributions will be included. The role of critical analysis and evidence-based thinking in scientific thinking should be incorporated into the declaration. He emphasised the need to amend laws to curtail pseudoscience spread by religious groups. He recommended asking "why" before accepting anything in order to maintain an inquisitive mind.

D Raghunandan presented the draft declaration and explained why it is necessary. He mentioned that the previous declarations and the criticism they received were taken

into account when preparing the new declaration. In this regard, the current situation in India was also taken into account.

After D Raghunandan presented the draft declaration, Dr. S P Ganchoudhury, Prof. Siddhartha Datta, Prof. A I Khan and Dr. M. Geyanand spoke in support of the declaration.

The Resolution was placed by Dinesh Abrol. On behalf of the presidium (Pramod Gouri) both the Statement and resolution were adopted.

As a way forward, Asha Mishra (General Secretary, AIPSN) mentioned her plan to translate the declaration into local languages to continue the campaign and strengthen scientific temper in the lower levels of society. The convention ended with a closing song by PBVM team and vote of thanks by S.R. Azad.

KOLKATA DECLARATION: SCIENTIFIC TEMPER IN THE CURRENT CONTEXT

We scientists and intellectuals across disciplines, activists and all individuals passionate about spreading a scientific temper, acknowledge that the struggle to promote a scientific temper is wide-ranging and embraces many dimensions. Yet we also understand that, given the grave threats posed in the current context, the major challenge in this period is to combat and roll back these threats. We re-attest the importance of working towards promotion of scientific temper in society. We appeal to like-minded individuals in academia and research institutions, the bureaucracy, and the political class to uphold constitutional values.

A Statement on Scientific Temper was drafted through an iterative process involving leading scientists and social scientists at the initiative of the All India Peoples Science Network. The following is an edited version of the Declaration signed by around 200 Scientists adopted at a Convention on Scientific Temper held at Kolkata on 28 February 2024.

A shortened version is given here to convey the flavour. The full Statement is available at https://aipsn.net/2024/03/03/declaration-and-resolution-on-scientific-temper/

Since the Coonoor Statement on Scientific Temper in 1981 and the Palampur Declaration in 2011, there have been significant socio-political changes in India and around the world. Over time, movements promoting scientific temper in India have also evolved in accordance with changing public perceptions of science and technology (S&T). New challenges have emerged in India and elsewhere in the world in the form of strong socio-political movements, backed by State power, that seek to oppose a scientific approach and evidence-based reasoning. Globally, a post-truth culture is spreading, marked by a deliberate spreading of ignorance, an anti-intellectual atmosphere, and diminished trust in science. It is ironic that technology, part of the umbrella of science, is being harnessed to support these trends through social media such that manufactured sentiment, prejudice, false narratives, baseless opinions and conspiracy theories gain acceptance.

DANGEROUS NEW THEATRE

The current situation in India demands critical understanding and action on three inter-related fronts: the role of the State and polity, the character and function of scientific research and academic institutions, and malign influences in society and among the general public. Article 51A (h) of the Constitution speaks of the duty of citizens to promote scientific temper.

ROLE OF THE STATE

In the initial post-Independence decades, the Indian State placed significant trust in scientists and scientific institutions. Development policies were evidence-driven, with research institutions and centers of excellence enjoying high priority and prestige, and substantial autonomy. Notably, religion played a minimal role in state affairs.... . While the State may not have proactively cultivated scientific temper, it did engage with and support activities to popularize science. The State also provided space in governance and public discourse for non-official scientific, expert, and informed lay opinion.

UNDERMINING SCIENCE AND A SCIENTIFIC APPROACH

Presently, the State displays a stark departure from this earlier stance. The government and its various organs now actively oppose a scientific approach, critical thinking and evidence-based policy-making. State support for research and development (R&D), already below comparable countries, has hit historic lows, raising serious concerns about India's future in the knowledge era. Independent development data and India's position in reputed international rankings are contested on spurious grounds. Similar data generated in India, even by government institutions, are manipulated to fit political narratives. Open discussions in higher learning institutions are discouraged, hindering critical thinking, pluralism, and academic freedom. Unscientific claims by prominent political figures, boasting of imaginary achievements and exaggerated ideas about knowledge in ancient India are used to build a hyper-nationalist narrative. Dissent and plurality of opinion, essential for intellectual progress, are under threat.

ASSAULT ON THE EDUCATION SECTOR

The trends mentioned above are now being introduced into the education system, potentially influencing an entire generation. School textbooks and readings in higher education are undergoing revisions promoting the unquestioned superiority of knowledge in ancient India, while downplaying the contributions of other civilizations…. The revised textbooks also omit chapters on crucial historical, societal, economic, and ecological issues in India. In an examination oriented rote-learning system not fostering critical thinking, this will leave students ill-prepared for higher studies or research, and for their roles as informed citizens.

In higher education, mandatory courses on "traditional knowledge systems" are being introduced, presenting a-historical and distorted accounts of knowledge in ancient India…. This deliberate rewriting of historical evidence perpetuates bias and a distorted view of syncretic Indian traditions and multi-cultural reality. This will result in incalculable damage to the progress of Indian science and to social harmony.

Kerala Science Slam 2024

SOCIETAL ATTACK

Today, social forces supported by the ruling establishment disseminate pseudo-science and a belief in mythology as history. False narratives are used to

construct a unitary majoritarian religion and culture, contrary to the diversity even among the majority community.

During the COVID pandemic, superstitions and pseudo-scientific notions related to health were actively promoted under the guise of endorsing "traditional" health systems while implicitly or explicitly criticizing modern medicine… The forces of unreason seek to sow confusion about evidence and scientific methods. It is also important to address the idea that "other worldly" religious beliefs pose the only or major obstacles to fostering a scientific temper in India.

At the same time, discriminatory practices, or those that impinge on others' rights or affect public order, must be opposed, and their irrational basis explained. Obscurantism persists due to weaknesses in society itself, highlighting larger battles that need to be fought, of which promotion of a scientific temper is just a part. A more strategic and targeted approach is required to tackle the organized challenges to scientific temper in the current context.

RESOLUTION ADOPTED BY THE AIPSN ALONG WITH THE "STATEMENT ON SCIENTIFIC TEMPER DECLARATION" IN THE "CAMPAIGN FOR SCIENTIFIC TEMPER CULMINATION PROGRAM AND NATIONAL CONVENTION FOR DECLARATION ON SCIENTIFIC TEMPER"

(A shortened version is given here to convey the idea. The full resolution is available in the links given earlier)

The term scientific temper is broadly defined as "a modest open-minded temper—a temper ever ready to welcome new light, new knowledge, new experiments, even when their results are unfavourable to preconceived opinions and long-cherished theories.

Accepting that the people care for the legacy of the freedom movement, constitutional vision, national unity and integrity, and do not doubt that the majority is concerned about economic, ecological and social justice, and they continue to think about fundamental rights and directive principles of state policy enshrined in the Indian Constitution;

Recognizing that the people as bearers of historical knowledge, skills and culture, and as social carriers of agro-food diversity, culinary heritage, dietary selections, continue to enjoy variegated range of food, health and fitness practices, and they would be willing to stand up once again against the bearers of sectarian politics trying to take away their economic, social and political freedoms;

Recalling that the contributions to modern science & technology made by many scientists who challenged the colonial order in S&T, and help develop the perspective and strategy of Scientific Policy Resolution (SPR, 1958) which cherished self-reliance and, embraced scientific approach to policymaking, the scientific and technological communities would not let the people suffer unreason and eliminate the space for pluralism and diversity from the world of higher education, science, technology and humanities;

Persuaded that as the post-independent India's transformative impulses of self-reliance that accommodated the Gandhians, Nehruvians and Leftists to practice their own S&T heuristics for development in the parallel, gave a place to the ethos of scientific temper and humanism in the Indian Constitution, and in the National

Curriculum Framework (2005) and in the Right to Education legislation (2008), the Indian S&T community and the people can be mobilized to defend these gains;

The Peoples' Science Movements (PSMs) call upon the state governments to resist the efforts that sow the seeds of hatred and conformism deep into the mind of the young under the influence of the idea of Hindutava – a destructor of social progress and universal brotherhood/sisterhood, and rededicate themselves to developing quality education with public purposes of national importance.

As PSMs, We solemnly affirm our constitutional right to defend the integrity of Article 51 A(h), and to ensure that the investments in education, science, technology, humanities and arts are considerably enhanced and directed to work for the realization of the scientific temper/outlook, for the cultivation of linguistic and socio-cultural diversity, for the universally cherished message of love ('Vasudhaiva Kutumbakam' – the world is one family') and for the secular and socialist idea of India and for the reduction of inequalities;

We will contribute to the movements seeking economic, social and ecological justice, and work for the dignified livelihood for the Indian people as a whole through education and research, commit to redouble our own efforts for the promotion of progressive anti-imperialist nationalism, and to strengthen the role and contribution of Indian S&T institutions in the processes of decision making and evaluation of the socio-economic policies under implementation;

Mobilize the scientific community to stand up for academic freedom, and actively collaborate with the democratic movement and civil society to defend civil liberties and democratic rights, freedom of expression, organization, representation and struggle through constitutional means, and expose and isolate the forces supporting the babas spreading fatalism and unreason, Collaborate and work with the rationalists, scholars, academics, scientists, technologists, social scientists, teachers of humanities and sciences, and professionals about the way forward for the realization of the above stated goals of social progress, propose policies, build institutions and establish a standing mechanism to pursue the challenge of cultivation of scientific temper, humanism and world peace.

SURYA TILAK AT RAM TEMPLE AND THE STATE OF SCIENCE

Gautam I Menon

The Surya Tilak project at the Ram temple in Ayodhya has been the subject of recent public interest. It involved constructing a mechanism to direct sunlight onto the forehead of the idol. This was to first happen at noon on April 17, the occasion of the festival of Ram Navami this year. The mechanism was to be designed so as to repeat its task every year on the festival date.

The difficulty is that this festival follows a lunisolar calendar. Purely solar or purely lunar calendars follow the motion of the sun or the moon respectively. Special festival dates, if they follow a solar calendar, are the same each year. However, if such festival days are at all tied to the phases of the moon, they will fall on different calendar dates each year.

Dates for most Indian festivals, including Ram Navami, have a lunar calendar component. Lunisolar calendars combine lunar and solar cycles. In Indian calendars, Ram Navami falls on Chaitra Shukla 9. The Navami is the lunar component, referring to the waxing of the moon, or Shukla; the solar Chaitra month relates to the positioning of the constellations.

For the Surya Tilak, once this date is calculated each year, this would translate into changing the position of the mirrors according to the shifting position of the sun to direct the sun's rays appropriately. To design a system that ensures that sunlight falls precisely on the idol each year thus requires some calculation. Given the complexity of problems that typically occupy astronomers, this is not excessively difficult. The appropriate dates corresponding to a lunisolar calendar can be calculated as far in the future as we want (Indeed, there are phone apps for this).

The setting up of the necessary equipment was done by scientists and engineers at two government-funded organisations, the Indian Institute of

Astrophysics (IIA) in Bengaluru and the Central Building Research Institute, Roorkee. IIA is an autonomous institute wholly funded by the Department of Science and Technology (DST). The Central Building Research Institute (CBRI), a government institution, is under the Council of Scientific and Industrial Research.In a post on X, viewed more than four million times at last count, the Secretary of the DST highlighted the work of these two organisations, speaking of "the accurate calculations and well-optimised design" of the Surya Tilak.

The comments on his post provide an interesting window into modern India. A random sample of these comments reads: "Our ancestors did this also without the help of modern tech. Good to see we are following our ancient roots in the new world also"; "Is there caste reservation in IIA?"; "The divine culmination of Bhakti and science, just like how it used to be in the ancient days"; and "What high school kids in other countries do as a project for a science fair ends up as a something that astrophysicists on Govt pay in India do for a temple".

Is this really a high-school science-fair project? The computation of the 19-year cycle, the Metonic cycle, after which the Ram Navami date repeats, is not too complicated. Such calculations were known to ancient astronomers. The design of the periscope arrangement needs expertise. Constructing the actual periscope arrangement using a system of mirrors, capable of movement in a graduated manner, is not as easy as it might sound. Some knowledge of telescope design is called for. Also a familiarity with design and machining, but perhaps not of the sort of accuracy that might require high-precision equipment.

It would have been possible to construct a combined electronic and computational mechanism that would have directed the mirror arrangement. However, keeping in mind the need for robustness, the designers took the not-unreasonable option of designing a manual system that only required adjustment once each year.The core question, though, is whether such a project, explicitly politico-religious in character, should at all have been taken up

by government institutions, required to function within the letter and spirit of our Constitution.

Since Independence, we have largely followed the principle that public institutions should not be asked to participate in explicitly religious activities. This in no way restricts scientists and engineers at those institutions in doing so on their own time. It is possible that this happened here, although the DST secretary's highlighting this achievement from a laboratory directly under him, admits no such nuance.

But how can publicly-funded institutions push back against such demands? Can they refuse such directions, even if routed indirectly via the government agency that funds them? What's to prevent another government, with different priorities, directing research institutions funded by it, to controversial political uses?

It is interesting that even the small number of distinguished former administrators of government funding bodies who have written in favour of the Surya Tilak project, have tended to evade these questions, focusing instead on its value as science outreach.

These are relevant especially in a country where essentially all funding for research flows from the government. India spends close to just 0.7 per cent of its GDP on research, a figure that is much smaller than what China or the USA spends. The slack, pushing scientific funding to 3 per cent or more of GDP in developed countries, is taken up by the private sector. Unfortunately, private-sector science research involvement in India is still at a nascent state.

What alternatives could reasonably have been explored? The Ram temple authority could have announced that it would fund a competition to find the best technical solution. Scientists associated with institutions such as the IIA could have, in their own time, and voluntarily, evaluated these solutions.

An Atal Tinkering Laboratory, from about 10,000 across the country, could have been asked to help with the hardware implementation of the successful idea,

with funding for this taken from private individuals or the temple trust. None of this would have required requests to government-funded institutions that would further a religious aim, even ignoring its political overtones.

In political science, the Overton window refers to the range of ideas and policies for which there is large-scale public support. Shifts in the Overton window bring new possibilities, hitherto unacceptable, into the mainstream. Such shifts can happen naturally, as society itself changes, or can be encouraged through deliberate political reframing.

The saga of the Surya Tilak project is instructive because it is a test of how we choose to define and implement the secular character of our state. It illustrates how our prior ideas of what is ethically and constitutionally defensible can be challenged, even as what is done is presented as a fete accompli.Once we get used to the idea that the government of the day can make such requests, whether directly or indirectly, it would be hard to turn the clock back.

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WHY MIX PSEUDOSCIENCE AND FAKE CLAIMS WITH A NEW SCIENCE DISCOVERY?

P. Rajamanickam and TV Venkateshwaran

An article written in Tamil published in the Bookday regarding the recent identification by scientists from India of a new snake species based on the fossil that was found in Gujarat identified the lack of scientific temper in the naming of the species and the pseudoscience generated based on the news.

As a background to that article, the scientific finding reported in the research publication is briefly described below:

From Scientific Reports (2004)

Debajit Datta and Sunil Bajpai from the Department of Earth Sciences at IIT Roorkee unveiled a remarkable find: a colossal snake fossil, attributed to the madtsoiid snake group. Their discovery was recently published in the April 18, 2024 edition of Scientific Reports. Recovered from the Panandhro Lignite Mine in Kutch, Gujarat State, Western India, the fossils comprise segments of a vertebral column, originating from an early Lutetian grey shale unit.

The snake, now officially called Vasuki indicus, marks one of the most colossal serpents documented, hailing from a period around 47 million years ago during the temperate Middle Eocene era in India. Its name derives from the Hindu mythological serpent 'Vāsuki,' often depicted encircling the neck of Lord Shiva. With an estimated body length ranging from 11 to 15 meters, this newly identified species claims the title of the largest known madtsoiidae snake, flourishing amidst an epoch characterized by an average temperature of approximately 28°C.

In terms of evolutionary lineage, Vasuki occupies a unique branch alongside the Late Cretaceous Indian species Madtsoia pisdurensis and the Late Eocene North African species Gigantophis garstini. Considering biogeographical factors and its connections with other madtsoiidae in both India and North Africa, it has been proposed that Vasuki signifies a surviving lineage originating from India. The collision between India and Asia approximately 50 million years ago likely facilitated the dispersal of this lineage from the Indian subcontinent to North Africa via southern Eurasia.

The unveiling of Vasuki underscores the importance and need of thorough exploration in Late Cretaceous and Paleogene Gondwanan deposits, given the limited anatomical understanding of known madtsoiidae.

For the sake of space what is translated and given below here are only selected parts from the Tamil article.The regions not given here are denoted by as a separator.
Kingdom: Animal Kingdom, Phylum: Chordata , Sub.phylum: Vertebrata Class: Reptilia Order: Ophidia, Family: Madtsoiidae,Genus: Vasuki,Species: Indicus

Scientists from India have discovered the remains of a long snake that lived on Earth before the Himalayas were formed. Researchers have named it Vasuki Indicus because of its long size. Misunderstanding this news and deceiving people, some people are falsely spreading propaganda that researchers have discovered the fossil of the legendary Vasuki snake.

It is understood that life appeared on earth 350 million years ago. The first organisms were most likely single celled. These evolved over time into many different organisms. Many of these archetypes eventually became extinct, like the dinosaurs. Now the researchers have discovered the remains of a snake species that represents the evolutionary relic from the same time as the early snake species.

In 2005, IIT-based researchers analyzed fossilized bones found in a coal mine in Kutch, Gujarat, and concluded that it was a snake skeleton, which some had earlier mistakenly believed to be a crocodile skeleton. After matching the bone fragments found, it was calculated that this type of snake was about forty, fifty feet - that is, about 10.2 m to 14 m long. Its length has been inferred from 27 fossilized vertebrae. It is believed that this snake would have been as long as a bus. They have also dated this snake to have lived about 4.8 million years ago.

Vasuki, the serpent, occupies an important place in Indian mythology. Puranic stories say that Siva, the god, had a large snake around his neck and this was used once as a rope around Merumalai to churn the sea.Therefore, the discovered snake species was named by the scientists as Vasuki to signify a large snake and Indicus because it is an ancient fossil found in India. So the scientific name given was Vasuki Indicus.

NAMING NEW ORGANISMS:

Often when a new species is discovered, it should be classified into Phylum, Sub Phylum, Order, Sub Order, Family, Genus, and Species. The scientist Linnaeus had to use binomial nomenclature to name a new species. That is why this snake is named Vasuki Indicus. Usually, when naming the species found in fossils discovered in such excavations, it is customary to name the species along with the scientist who discovered it, the family of the animal, and the specific country.At times myths are also invoked. As such, the name 'Vasuki Indicus' has been given a combination of the name of the snake 'Vasuki' from

Indian mythology and the name 'Indicus' to indicate that it was found in India.

Vasuki Indicus is not the oldest and largest snake found in the world. A snake fossil named 'Titanoboa Sp.' was found in a coal mine in Colombia. It was 14.3 meters long and one meter wide. In terms of size and length, it is estimated to be the world's largest snake fossil ever found. It is also 60 million years old. The fossil of a snake called Parviraptor found in England is the oldest known snake species in the world. It is said to be 140 million years old. Christianity believes that it was Satan in the form of a huge snake that disobeyed God's command not to bite a ripe apple in Eden. Yet no one falsely claims that Parviraptor is the Satan of the Book of Revelation; but the discovery of an old fossil by a team of Indian researchers, and naming it as Vasuki Indicus has ludicrously triggered a veritable social media buzz, that the fossil of mythical Vasuki has been found.

TYING SCIENCE TO PURANAS

In a Hindu Purana, using the serpent Vasuki as a rope holding Mount Meru as a rod, the Devas stood on one side and the Asuras on the other side, and churned the ocean to get rare things including nectar. But before that came the poison and to save the world Siva drank it. However, Parvati held the neck of Siva and prevented the poison from entering the stomach. So his neck turned blue and he got the name Neelakanda – the blue throated god. As the puranic story continues, after this Lord Shiva put it as a garland around his neck. The name of this mythical snake has been given to the snake identified by the recently discovered fossil. Many people are spreading fake news hiding this fact and implying that the fossil of the snake discovered is the proof of the mythical snake, and the historical veracity of Puranic claims.

Did they find the mythical snake Vasuki? No, a person with a name like “Kannaiyram” means in Tamil ‘a person who has 1000 eyes’ but in reality he does not have a thousand eyes. Similarly, the Vasuki Indicus snake has no relation to the mythical serpent Vasuki which in the puranic story is used as a rope for churning the sea using the Himalaya as a rod. It is shameful that some, including a section of the media, is spreading the false claim that scientists have discovered fossil remains of Puranic snake, vasuki.

Scientific discoveries should be seen as science. The world is amazed at the discovery of this fossil of this type of snake. But twisting and turning these news stories and publishing fake news is an act of demeaning ourselves and fooling people. Comments help: Dr. Krishnaswamy, Dr. Rajsiva (Germany)

MEMBER ORGANIZATIONS

Assam Science Society, Assam
Bharat Gyan Vigyan Samiti (BGVS), Bihar
Bharat Gyan Vigyan Samuday, Maharashtra
Bharat Gyan Vigyan Samiti (BGVS), Karnataka
Bharat Gyan Vigyan Samiti (BGVS), Odisha
Bharat Gyan Vigyan Samiti (BGVS), Punjab
Bharat Gyan Vigyan Samiti (BGVS), Rajasthan
Bharat Gyan Vigyan Samiti (BGVS), Tripura
Bharat Gyan Vigyan Samiti (BGVS), Uttar Pradesh
Bharat Gyan Vigyan Samiti (BGVS), Uttarakhand
Bharat Gyan Vigyan Samiti (BGVS), Jharkhand
Bharat Gyan Vigyan Samiti (BGVS), Madhya Pradesh
Bangiya Saksharata Prasar Samity, Bengal
Centre for Technology and Development (CTD), Delhi
Chhattisgarh Vigyan Sabha, Chhattisgarh
Delhi Science Forum (DSF), Delhi
Eklavya, Madhya Pradesh
Ellora Vigyan Manch, Assam
Federation of Medical Representatives Associations of India (FMRAI)
Forum of Scientists, Engineers and Technologists (FOSET)
Gyan Vigyan Samiti, Assam
Himachal Vigyan Manch, Himachal Pradesh
Himachal Gyan Vigyan Samiti, Himachal Pradesh
Haryana Gyan Vigyan Samiti, Haryana
Haryana Vigyan Manch, Haryana
Jan Bigyan O Prajukti, Odisha
Jan Samwad Samiti Uttarakhand
Jan Vigyan Vedika (JVV), Andhra Pradesh
Jan Vigyan Vedika (JVV), Telengana
Karnataka Rajya Vijnana Parishat (KRVP), Karnataka
Kerala Shastra Sahitya Parishad (KSSP), Kerala
Madhya Pradesh Vigyan Sabha (MPVS), Madhya Pradesh
National Confederation of Officers Associations of Central Public Sector Undertakings (NCOACPSU)
Navnirmiti, Maharashtra
Paschimbanga Vigyan Mancha (PBVM), Bengal
Pondicherry Science Forum (PSF), Pondicherry
Science for Society, Jharkhand
Society for Technology and Development (STD), Himachal Pradesh
Tamil Nadu Science Forum, Tamil Nadu

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