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RESEARCH ARTICLE

A Perspective on Scientific Temper in India

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ABSTRACT

The term "scientific temper" was first used in India by Pandit Jawaharlal Nehru in 1946. After he became the first Prime Minister of Independent India in 1947, Nehru relentlessly expanded the notion of scientific temper and strived hard to convince the political and scientific leadership to inculcate scientific temper among its citizens. However, this discourse is rooted in the pre-Nehruvian era. Though the term scientific temper was not in use, a number of social reformers, scholars and scientists advocated the need to instil a sprit of scientific enquiry in the society. The Post Nehruvian period witnessed the Government's commitment in its science and technology policy statements and constitutional amendments to develop scientific temper. In 1981, a statement on scientific temper was issued by a group of individuals, which evoked support as well as criticism from different quarters. In 2011, an attempt was made to revisit the 1981 scientific temper statement and the outcome was a revised statement, now known as the Palampur Declaration. This was followed by two international conferences and workshops, which built upon the conceptualization of Scientific Temper as well as a plan of action to promote it. The present paper attempts to situate the notion of "Scientific Temper" in the Indian context, and expose the nuances of how this concept has been developed.

KEYWORDS: Scientific temper, Statement, Policy, Palampur Declaration

Introduction

The discussion on scientific temper in India often takes recourse to Pandit Jawaharlal Nehru's original ideas on scientific temper first published in his much acclaimed book *Discovery of India* in 1946 (Nehru, 1946). After becoming the first Prime Minister of independent India Nehru reiterated repeatedly the necessity of

creating a scientifically minded society in various forums, and particularly in his addresses to scientists. The Scientific Policy Resolution (SPR) of the Government of India, adopted by both the Houses of Parliament in 1958, reflected the national aspiration based on which Nehru was able to build on the concept of scientific temper (SPR, 1958). SPR was an expression of India's political leaders' faith in science and the role that technology could play in national development.

After Nehru‘s death, science and technology policies revised and re-formulated by the Government of India reiterated commitment to cultivate scientific temper in the country. In 1976, through a constitutional amendment ‘To develop the scientific temper, humanism and a spirit of inquiry and reform’(Shukla, 1988) a nodal agency, the National Council of Science and Technology Communication (NCSTC), was set up under the Department of Science and Technology to take necessary measures to inculcate scientific temper in the citizens (NCSTC, 2002).

In 1981, a group of intellectuals, scientists, educationists and thinkers made an attempt to initiate a discussion on scientific temper at the national level. A Statement of Scientific Temper was issued (Bhargava and Chakrabarti, 2010:183-200).

However, despite these efforts, scientific temper did not permeate in society to make any perceptible impact on the national psyche. As Narlikar opined, ‘Today we live in a free India that is feeling its way towards economic prosperity. Yet we are still a long way from achieving that scientific outlook which Nehru considered so essential for our future wellbeing’ (Narlikar, 2003). Similar concerns were expressed by Bhargava: ‘If one were to pick out three or four most important reasons for the country's backwardness or failure in many areas, the lack of scientific temper would be one of them’ (Bhargava and Chakrabarti, 2010:277). Nehru’s dream about the spread of scientific temper in the country has remained largely

unrealised, in spite of significant growth in science and technology in India.

The present paper describes how Scientific Temper has been conceptualized and promoted in the Indian context. By examining the issues surrounding these attempts, we arrive at a nuanced notion of a concept that is a dire need of these times.

Early Attempts to Promote Scientific Temper

While the term "scientific temper" is contemporary, appeals to rational enquiry are not new in the Indian ethos. A poignant illustration of the encouragement of a rational attitude in India's distant past is Buddha's admonishment in the *Kalama Suta:* 'Believe nothing merely because you have told it or because you yourself imagined it; do not believe what your teacher tells you merely out of respect for the teacher…' (Bhargava and Chakrabarti, 2010:284).

In the more recent past, Raja Rammohun Roy (1772-1823) contributed significantly towards India's transition to modernity. Roy's social reforms in the eighteenth and nineteenth centuries narrowed the gap in attitude towards science and technology between India and Europe (Narlikar, 2003:88). Roy paved the way for creating a space for deliberating on the need of rational outlook on several occasions through his social reforms. Commenting on Rammohun's advocacy of scientific temper, Narlikar wrote: 'A term that is current these days but which was not used in the Raja's times, although he advocated it in many of his speeches and works, is scientific temper. Scientific temper teaches us to sift the available evidence objectively and base our actions on a rational approach. Roy was a rationalist in his advocacy of reason and freedom of thought.' (Narlikar, 2003:90).

Pandit Jawaharlal Nehru emphasized that Roy's social reforms were cases for the salience of scientific temper in the Indian context (Nehru, 1946: 315). Roy wanted Indian students

to be equipped with modern knowledge, due to which he strongly opposed the proposal of the British Government to start a Sanskrit College in Kolkata. He wrote to the British Governor General Lord Amherst: 'The Sanskrit system of education would be best calculated to keep this country in darkness if such had been the policy of the British Government. But as the improvement of the native population is the object of the government, it will consequently promote a more liberal and enlightened system of instruction, embracing mathematics, natural philosophy, chemistry and astronomy with other useful sciences' (Narlikar, 2003:96).

Roy realised that the religion practised by the Hindus was not conducive for their social development and keeping pace with the changing world. In 1823, he wrote: 'The distinctions of castes introducing innumerable divisions and subdivisions among them has entirely deprived them of patriotic feeling, and the multitude of religious rites and ceremonies and the laws of purification have totally disqualified them from undertaking any difficult enterprise' (Narlikar, 2003:97). Roy's criticism of religious practices emanated from his desire to make religion consistent with modernity.

Rajendralal Mitra (1822/23-1891), the first modern Indologist of Indian origin and a key figure in the Bengal Renaissance, took on the baton for promoting social reforms through rational thought (Mitra, 1978). Mitra was a founder member of the British Indian Association established in 1851. He was also the first Indian President of the Asiatic Society of Bengal. Saraswati termed Rajendralal Mitra as the first Indian '[T]o challenge the sanctity of tradition, break away from its entangling meshes and establish the need for scientific objectivity in Indian historical thinking (Saraswati, 1978). Ghosh in an article entitled "Popularisation of Science in Bengal: The Pioneering Role of Rajendralal Mitra", writes: 'Rajendralal's faith in the spirit of science was grounded in a wonderful sense of history and social evolution. Rejecting dominant social beliefs he would instead look into historical texts for truth. One of his

articles published in *Indian Antiquity*, titled 'Beef in Ancient India', was revolutionary. Realising that for the majority of his countrymen the title itself may be unsavoury Mitra returned to the ancient literature, made a careful analysis of old texts, and concluded that beef eating was not all banal in the eyes of Hindu religion' (Ghosh, 2000:73) In his popular articles, Mitra criticised *kaulinya pratha*, child marriage, polygamy, *Ganga jatra* and *sati* as brutal evils. In an article entitled "Nectomancy", he described how the belief in paranormal powers led to witch-hunting in Europe (Ghosh, 2000:72). Witch hunting was also practised in India at the time.

Mitra rejected the Bengali chauvinism and promoted a rational outlook. Communicating with a hilarious style of presentation, he reminded the Bengali chauvinists that '[W]hen clusters of tiny insects like the muddy-shrimps is an item on our dish, we cannot disparage others eating frogs' (Ghosh, 2000:72). It should be mentioned that Mitra was not a firebrand social reformer; at times he held conservative views on social issues.

Ghosh observed that the considerations that prompted Rammohun Roy and Rajendralal Mitra to advocate western models of science education also influenced Prafulla Chandra Ray. Prafulla Chandra Ray, a staunch nationalist and founder of the Indian school of modern chemistry was a strong advocate of scientific temper. This is evident from his remarks in his presidential address to the Indian Science Congress in 1920:

"While the study of Science is essential to our material advancement it has a special need and significance for the culture of Indian youth. A long period of intellectual stagnation, as observed before, had produced in us a habit of dependence on the authority of the *shastras*. Reason was bound to the wheel of faith and all reasoning proceeded on assumption and premises that it was not open to anybody to call in question or criticise. Intellectual progress was handicapped under these conditions and it is no wonder that India cannot point to any notable

achievement in this line during the thousand years that preceded the advent of British rule. Reason has thus to be set free from the shackles and the function of Science in achieving this end is indisputable. Science takes nothing on trust but applies to them all the methods of investigation and criticism. I look forward to the growth of this scientific spirit in our country to liberalise our intellect" (Ray, 2003:92).

Ghosh, commenting on Ray's realisation of the negative effect of the caste system and concepts like world-denying *mayabad,* wrote: 'A strongly entrenched caste society, he (Prafulla Chandra Ray) observed, with its disastrous degradation of the social status of technicians, craftsmen and other manual workers, was the main cause of decline of scientific spirit in India. Also, it did not escape Ray that ideological and philosophical factors, like the world-denying *Mayabad* preached by Sankara, contributed to the decay of scientific temper' (Ghosh, 2000:69-70).

Pandit Nehru took a nuanced view of our religious and philosophical heritage, and its points of conflict with science. Nehru admitted that religions helped greatly in the development of humanity by establishing values and principles to govern human life. But he also asserted that religions '[I]mprisoned truth in set forms and dogmas, and encouraged ceremonials and practices which soon lose all their original meaning and become mere routine' (Nehru, 1946:511). Religions did not encourage curiosity and free will; rather they made their adherents submit to nature and age-old traditions. Religions tended to make human beings afraid of the unknown and discouraged the inherent tendency of change and progress in human beings.

While Nehru believed that the scientific temper should be the guiding principle in governing human actions, he also argued that some reliance on moral, spiritual, and idealistic conceptions was necessary. In the absence of such conceptions, there will be 'no anchorage, no objectives or purpose in life' (Nehru, 1946:513). Nehru observed: "Whether we believe in God or not, it is impossible not to believe in something, whether we

call it a creative life-giving force or vital energy inherent in matter which gives it its capacity for self-movement and change and growth, or by some other name, something that is real, though elusive, as life is real when contrasted with death" (Nehru, 1946:513).

Nehru first defined and elaborated the concept of scientific temper in *The Discovery of India*, making the following salient points (Nehru, 1946:509-15):

- There is an element of inevitability about the applications of science and technology. However, mere applications of science and technology will not be a sufficient condition. What is needed 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 fact 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.'
- Scientific temper is the temper of a free man.
- Scientific approach should be an integral part of our social interactions, as expressed by the quote "The scientific approach and temper are, or should be, a way of life, a process of thinking, a method of acting and associating with life, a process of thinking, a method of acting and associating with our fellowmen."
- While we live in a scientific age, there is no evidence of scientific temper in the people or their leaders.
- Even scientists who practice science do not necessarily have scientific temper.

Following Nehru's vision, the Indian Parliament adopted the Scientific Policy Resolution (SPR) of 1958, which enunciated the principles on which the growth of science and technology

would be based. The SPR-1958 asserted that the Government of India visualised modern science and technology as the chief instrument for social transformation. 'The dominating feature of the contemporary world is the intense cultivation of science on a large scale, and its application to meet a country's requirements. It is this, which, for the first time in man's history, has given to the common man in countries advanced in science, a standard of living and social and cultural amenities, which once was confined to a very small privileged minority of the population… It is only through the scientific approach and method and the use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community… (SPR, 1958).

After Nehru's death, the Congress Governments at the centre continued the legacy of Nehru. The document "Science and Technology Policy 2003" of the Government of India urges 'To ensure that the message of science reaches every citizen of India, man and woman, young and old, so that we advance scientific temper, emerge as a progressive and enlightened society, and make it possible for all our people to participate fully in the development of science and technology and its application for human welfare. Indeed, science and technology will be fully integrated with all spheres of national activity.' (Science and Technology Policy, 2003).

Following the initiative undertaken by Satish Dhawan, Abdur Rahman and P. M. Bhargava, a Society for the Promotion of Scientific Temper (SPST) was launched in 1964. Its sole objective was to promote scientific temper in the society. However, the Society did not survive long. Bhargava and Chakrabarti wrote: 'The Society for the Promotion of Scientific Temper died a natural death: this chapter on development of scientific temper in the country was closed but many lessons were learnt from it, one of them being that scientific temper was an important ingredient of any recipe for not only social and economic but also scientific and technological advancement of our country'(Bhargava and Chakrabarti,

2010:26-29). The SPST also issued a statement, which was published in *Seminar*.

Scientific Temper Statement

The Nehru Centre, Bombay issued a document titled 'A Statement on Scientific Temper' on 19 July 1981, which was signed by a group of eminent intellectuals, scientists and academicians. P. N. Haksar hoped that the statement would succeed in generating a nationwide discussion and also '[G]enerate a movement for the much needed second renaissance' in the country (Statement on Scientific Temper, 1992:185).

The Statement articulated a notion of scientific temper at the heart of which was the method of science. The scientific method was the essence of all human knowledge, cross-cutting the natural sciences and social sciences. Its fundamental feature was 'the spirit of enquiry and acceptance of the right to question and be questioned' (Statement on Scientific Temper, 1992:192-93). Viewing knowledge as open ended and evolving, the statement unequivocally noted that Scientific Temper was incompatible with theological and metaphysical beliefs. While science was universal, religions and dogmas are divisive.

The Statement evoked strong responses, both positive and negative, in certain circles of academia (Chadha, 2005; Prasad, 1982; Popli 2003). A number of articles and letters were published in two magazines viz., *Mainstream* and *Secular Democracy*. Asish Nandy issued a counter-statement entitled 'A Counter Statement on Humanistic Temper' and he declared 'The ultimate logic of scientific temper is the vulgar contempt for the common man it exudes' (Nanda, 2003:207).

The Statement did not generate nationwide debate as was hoped. Gita Chadha wrote:

"It is a significant fact that many of the signatories to the published draft on 'scientific temper' were people who have had

a very important role in matters of science policy in India. It is precisely for this reason that such a document should have reflected different viewpoints, including importantly, those of the ethics. Instead it became what is essentially a monolithic self-congratulatory document that provoked strong reaction from some critics in the academia" (Chadha, 2005).

The Madras Group of Patriotic People for Science and Technology (PPST) in a statement entitled 'The Statement on Scientific Temper: The Educators in Need of Education' while analysing the Statement on Scientific Temper concluded that:

> "the statement on Scientific Temper does little service to either reason or rationality, leave alone social justice and transformation by refusing to abandon the outlook and stand-point inherited from the 'colonial masters by refusing to liberate itself from the colonial domination of our minds' that it itself speaks of. Shorn of details, it is an attempt to provide a defence (of whatever is being done in the name of science, technology and development over the decades; defence of: the role being played by the high-priests of our science and technology establishments; a defence of the urban-centred and western-inspired paths of development being pursued with catastrophic consequences. It manages to do this in the most insidious manner, all shaking with 'righteous indignation, at (and only at) what it calls superstition, obscurantism etc. as being the cause of our maladies. Can it be just a coincidence that such a profound defence is being trotted out precisely at a time when the entire Western-inspired, city centred, high technology developmental path, is increasingly coming under fire from farmers' agitation, environments, tribal movements etc" (Statement on Scientific Temper, 1992).

Rajendra Prasad echoed a similar sentiment in his comment: "If the Bombay statement is a muddle-headed and logically

contradictory attempt to understand the process of growth and development of science and society, the counter-statement issued by Ashish Nandy is both phoney and pernicious. The former, paying lip-service to the significant role of science in creating an egalitarian society, believes that the Indian ruling classes can deliver the goods provided only that the logic of planning and the logic of our socio-economic structure are 'scientifically' harmonised. The latter is an unashamed defence of the status quo which couches its glorification of obscurantism in presumptuous philosophy" (Prasad, 1982).

Some of the objections raised against the Statement on Scientific Temper were:

- The Statement was not properly articulated.
- The Statement gave exclusive emphasis on a particular knowledge-system, viz., the method of science.
- Every form of India's past tradition and culture was condemned in the statement.
- The notion of scientific temper presented appeared to foster contempt for the common man.
- No attempt was made in the statement to reconcile scientific temper with Indian traditions and social structures. Science was pitted against religion in the statement.
- An alibi on part of the highly placed signatories was being put forth to escape responsibility for perpetuating an egalitarian order in developing this vision.
- The Statement appeared to enforce a commitment to socialist revolution.
- Superiority of the method of science against the collective wisdom of Indian people was questionable.
- The debate on scientific temper has been made a vehicle for ideologies that have little to do with science.

- A defence of the urban-centred and western-inspired paths of development being pursued which could have catastrophic consequences.
- The Statement was more of rhetoric than dealing with relevant issues.

These critiques are based on a limited understanding of the context of the Statement. The proponents of scientific temper do not condemn the entire past tradition, rather they advise a critical and rational view of it. Raja Rammohun Roy was not a blind supporter of western education and denigrator of India's past. On many occasions Roy presented spirited defence against unreasonable attacks by Christian missionaries. Rajendralal Mitra too was a great admirer of India's past. Prafulla Chandra Ray was a great patriot, who once declared '[S]cience can afford to wait but *swaraj* (self-rule) cannot', (Sengupta and Ray, 1989:85) but at the same time he did not hesitate to criticise the negative and reactionary elements of India's religious and social practices.

There is no denying that we need to break with some aspects of our socio-religious heritage like astrology or other superstitious beliefs. As Nehru said, 'India must break with much of her past and not allow it to dominate the present. Our lives are encumbered with the dead wood of this past; all that is dead and has served its purpose has to go. But it does not mean a break with, or a forgetting of, the vital and life-giving in that past. We can never forget the ideals that have moved our race, the dreams of the Indian people through the ages, the wisdom of the ancients, the wisdom of the ancients, the buoyant energy and love of life and nature of our forefathers, their spirit of curiosity and mental adventure…' (Nehru, 1946:509) Nehru clearly stated that '[T]here is, in fact, essential incompatibility of all dogmas with science. Scientific temper cannot be nurtured by ignoring the fact that there are 'major differences between the scientific attitude and the theological and metaphysical attitude, especially in respect of dogmas'.

Dogmas and preconceived beliefs are totally incompatible with the scientific method.

The 1981 Statement does not deny the necessity of nurturing and promoting the positive social values like equality, dignity of every human being, distributive justice, dignity of labour, and social accountability of one's actions, rather it calls for reinforcement of these values. It asserts that scientific temper cannot flourish in 'grossly in egalitarian society' (Statement on Scientific Temper, 1992:194.). Also, the 1981 statement should not be construed as an attempt to perpetuate the colonial mindset. In fact, its signatories claim to draw inspiration from Indian people of all walks of life who joined hands and struggled to overthrow the colonial domination of our land and minds. The statement emphasises the removal of every form of colonial legacy that still persists in our society.

Those who opposed the Statement on Scientific Temper were opposed to modern science in any form. In the guise of highly academic debate or 'common people-oriented' approach, they denigrated the attempt to move towards a society with rationally motivated citizens and social values like equality and dignity. This may appear as a utopian vision. Some people may think only a socialist society can have the above attributes and they are comfortable in the present social structure. Such a view furthers the cause of the traditionalists or status-quoists and the divisive forces. Projecting the Statement or any attempts of articulating the tenets of scientific temper as simply an exercise in rhetoric or a ploy to usher in a socialist revolution is certainly a backward step. It is pertinent to quote Meera Nanda in this context: 'In the long term, the opponents of scientific temper have done much damage to the secularist cause…they have succeeded in putting the secularising elements of popular science movements on the defensive' (Nanda, 2003:223-224).

In the 1980s, People's Science Movements emerged in different parts of the country. These Movements spearheaded by Kerala Sastra Sahitya Parishad and supported by the National

Council for Science and Technology Communication resulted in two massive mobilisations in the forms of Bharat Jan Vigyan Jatha-1982 and Bharat Gyan Vigyan Jatha-1987.

Palampur Declaration and Beyond

In 2011, an attempt was made to revisit the 1981 Statement of Scientific Temper. The document prepared and adopted during the national consultation is known as the 'Scientific Temper Statement Revisited-2011: The Palampur Declaration'. This was later revalidated in an international conference on scientific temper organised by the four premier agencies of the Government of India viz., Council of Scientific and Industrial Research-National Institute of Science Communication and Information Resources (CSIR-NISCAIR), National Council of Science Museums (NCSM), National Council for Science and Technology Communication (NCSTC) and Vigyan Prasar in January 2012 in New Delhi.

The Palampur Declaration begins by reiterating the notion of Scientific Temper as first articulated by Pandit Jawaharlal Nehru. It asserts that the tradition of scepticism and humanism is not new to Indian intellectual discourse and goes back to antiquity. The Statement underlines the fact that science has made it possible to understand life, mind and universe without taking recourse to supernatural and revealed knowledge. Moreover, scientific knowledge is universal.

The Palampur Declaration does not abandon practical and useful traditional knowledge simply because it is traditional. "The pace of technological intrusion, without essential back-up support of scientific knowledge base, introduces cultural and social distortions within traditional cognitive structures. Lack of effort in providing the necessary complementary scientific knowledge base to the population at large is consolidating these distortions resulting in the erosion of democratic structures. Moreover, technology-driven modernisation creates a cognitive

gap due to loss of traditional knowledge, which is being filled in by reiligiosity in new forms" (Scientific Temper Statement: Palampur Declaration, 2011).

Conclusion

This article has attempted to unpack the nuances in the notion of "Scientific Temper" based on its articulation in the Indian context. The role of scientific temper cannot be overemphasized in a country like India, where myriad dogmas and superstitions compete for one's attention. Scientific temper is an invaluable tool for the common people engaged in sound decision making not only about science but various issues of social importance.

Scientific temper remains elusive even today, in spite of the fact that there is tremendous growth in science and technology and dependence on it for the growth of the country's economy. The dogmatic beliefs are being spread continually, ironically, through the means of modern science and technology. People who have vested interests in perpetuating the existing social consciousness continue to oppose the basic tenets of scientific temper.

The transition towards a society guided by the spirit of scientific enquiry will not be an easy task. It will not be achieved merely by making people simply aware of the concept. It will be achieved only through a democratic political process.

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