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RESEARCH ARTICLE

## Scientific Thinking in Historical Perspective

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### ABSTRACT

We talk of scientific temper today in the context of Nehru's overt commitment to the idea. It can be safely said that scientific temper is also one of the important Nehruvian policy legacies which we inherited and have always tried to keep alive, of course, not as successfully as we would have liked it to be. Most of the times it gets embroiled in confrontation with faith and all sorts of arguments, for and against, are exchanged between the votaries of each of them. We tend to forget, in the heat of arguments, that people of faith have played crucial role in the progress of science from times immemorial, including modern science as well. It is not a question of either/or, just a reconciliation of the two. Religions have also been emancipatory in intent, as was the case with Islam in the early centuries and before it got institutionalized and mired in superstitions. I will try to engage with some of the related issues in historical context, a period when the term scientific temper was not around, yet there were a large number of autodidacts and intellectuals who appealed for a rational approach in our daily lives and also disseminated modern science in local language. They used science to fight against dogmas and superstitions proclaimed in the name of religions.

**KEYWORD:** Scientific Temper, Rationalism, Belief & Scientism

Before coming to the main subject, let me digress a bit to delve into Jawaharlal Nehru's passionate commitment to science and scientific temper. This is something, we in India, heard him talk about before independence and which became the core of his governance after he took over as prime minister. For him science was not merely an instrument for progress, it was essentially an attitude which he wished Indians to cultivate in all walks of life. His scientific thinking was not confined to scientists alone; he wanted history and culture also to be explored with a scientific

approach. For him scientific thinking and tradition and culture were intertwined when he said ‘No tradition which makes one a prisoner of one's mind or body is ever good’.<sup>1</sup> In 1939, almost a decade before independence, he spoke in Delhi University, saying ‘Science is a great force in the present age. You should imbibe the spirit of science and think on scientific lines. The impartial spirit of science has to be brought to bear on all the details that confront us in our daily avocations.’<sup>2</sup> Whenever Nehru wrote or spoke there was always a ‘searching, critical, and questioning spirit that is characteristic of the man of science.’ (Kabir, 1965) Inaugurating the 34th session of the Indian Science Congress, which was held in Delhi in January 1947, he expressed the hope that as ‘India was on the verge of independence and science in India too was coming of age, it would try to solve the problems of new India by rapid planned development in all sectors and try to make her more and more scientific minded’.

What Nehru spoke in the mid-twentieth century onwards was taken up by a few committed science teachers and popularisers of science and scientific thinking in the nineteenth century Delhi. They had to cope with an entrenched superstitious worldview, deeply rooted in our age-old religious and cultural beliefs. During the colonial times, there was no state support to take the message across to the young and old. Despite such limitations few committed autodidacts continued a sincere campaign to sensitise people about scientific thinking as well as fight against irrational beliefs.

The mid-nineteenth century Delhi was not only faced with the challenge of colonial regime but also with the encounter of new knowledge and education which accompanied it as its baggage. In Europe modernity came about organically after more than three hundred years of churning, leading to the fall of feudalism and archaic beliefs and the emergence of mercantilism, capitalism and modern science. India, on the other hand, missed this stirring; modern science was transplanted onto

<sup>1</sup> At the seminar and exhibition of Architecture, New Delhi, March 17, 1959.

<sup>2</sup> Speech at Delhi University, February 14, 1939, *The Hindustan Times*, February 15, 1939.

the strong traditional knowledge base, which remained entrenched while modern science and values also took root with the expansion of colonialism. They co-exist till today, despite huge all-round progress and the conflict between the two surfaces time and again, often resulting in the fatal attacks on rationalists. Like other parts of India, Delhi also witnessed this encounter between the two worldviews, where Dilli (Delhi) College became a pivot around which most of this battle was fought.

Dilli College had men with a critical imagination who were firm believers in their respective faiths; their commitment to rationalism and scientific thinking did not impinge upon their religious belief. Few of these were led by Master Ramchandra, a science teacher and populariser of science at the college and supported by his students like Munshi Zakaullah and Deputy Nazir Ahmed. Ramchandra, as a pioneer, desired a transformation in the available Indian context through his advocacy of rational and scientific thinking in all walks of life. The ratiocination for this transformation had to have recourse to rationality and realism. I have taken the liberty of rendering the Urdu, *haqeeqat nigari*, as 'realism'. With this end in view, Ramchandra wrote prolifically on what he considered to be irrational and unscientific beliefs that had crept into Indian society over a period of time. He urged his readers to look at events and ideas rationally and not through traditional eyes. (Jafar, 1960) If we look at Ramchandra as an Urdu literateur, a tradition to which he made an immense contribution, we find that he was the first to introduce a spirit of rationalism and realism into nineteenth-century Urdu writing.<sup>3</sup> In the words of Mohammad Sadiq, a historian of Urdu literature, Ramchandra belonged to:

the *avant-garde* of all literary and social reforms in Northern India... [He] had a modern outlook and advocated the assimilation of whatever was progressive and healthy in the West. He subjected everything in the life and literature of the day to a searching criticism. (Sadiq, 1984: 316)

<sup>3</sup> 'Mantiq aur Falsafa' in *Fawa'id*, June 1850.

Sadiq further writes that ‘his (Ramchandra’s) articles on scientific subjects, with their mild infusion of rationalism, caused not a little stir in the city’ (Sadiq, 1984: 614). In one of his articles countering unscientific and irrational attitudes of the people titled *Mantiq aur Falsafa*, Ramchandra commented:

The ignorant hold that the Gods destroyed the Greeks when they gave too much emphasis to reason and began interfering with his creation. Others held that the Greeks had their own Moon and its light travelled several miles.... (Jafar, 1960).

The rise of rationalism was not confined, of course, to India. The attempts of thinkers like Ramchandra must be seen in relation to the ideology of rationality, which had been gaining ground since the seventeenth-century. This scientific rationality was implicit in the social critique of feudal society moving into its industrial phase. Today this ideology would be labelled nineteenth-century positivism.<sup>4</sup> It gained the attention of men who had been deeply affected by scientific discoveries and wanted social change, yet needed the security of a religion (Forbes, 1975:15). But to call Ramchandra a positivist in the contemporary sense of the term would be anachronistic, at best; rather, he may be cautiously typified a proto-positivist. Auguste Comte, himself, was greatly appreciated by nineteenth-century Indian intellectuals and his writings were a formative element in some aspects of Indian thinking during this period.<sup>5</sup> Moreover, Auguste Comte ‘...was generally sympathetic to the early Indian tradition, partially due to the influence of the Orientalists but also due to the influence of French and German sociological thought...’<sup>6</sup> Comtean positivism was first publicly mentioned in India during a lecture delivered by Harish Chandra Mokherjee at the Bhowanipore Brahmo Samaj in 1856 at Calcutta (Forbes,

<sup>4</sup> In seeking the sociological grounding of nineteenth-century positivism, Redner typifies the first phase as that of sociological positivism having its roots in reformist bourgeois thought of the nineteenth-century (Comte. Renan. Taite. Durkheim. Mill, Spencer); the second is that of scientific philosophy rooted in the industrialized state at the turn of the nineteenth-century (Mach. Frege, Weber. Hilbert. Young, Einstein. Pareto). Harry Redner *Ends of Philosophy: An Essay in the Sociology of Philosophy and Rationality* (London. 1986).

1975:50). But by this time, Ramchandra's scientism had already matured, and any present reading that attempts to trace the influence of Comtean positivism upon him would be dubious.

How does one locate this proto-positivism? In the first instance, there is the implicit assumption of the value neutrality of science, by virtue of which it is impartially allowed to cut across any religious creed or practice, and yet retain a Christian flavour.<sup>7</sup> Ramchandra saw no contradiction in this. In his popular writings on the history of science, and on the workings of some technological devices, particularly in his newspaper, *Fawaid-ul-Nazrin*, Ramchandra relentlessly attacks superstition and blind religious practices. As a matter of fact, rationalism and religious universalism were the two important intellectual and ideological strands of nineteenth-century thought.<sup>8</sup> The earliest evidence of discourses characterizing modern scientific rationality in this period can be found in Raja Ram Mohan Roy's *Tuhfat-ul-Muwahidin* published in 1803. Here Ram Mohan attacked miracles and superstitions and upheld demonstrability and rational explanation as the only basis of truth.<sup>9</sup> Syed Ahmed

<sup>5</sup> R. Thapar, 'This disillusionment with indigenous religious traditions was deliberately engineered by the Evangelicals during the Company rule. The evangelicals 'concentrated on trying to prove that the essential backwardness of India, as they saw it was due to the Hindu religion'. Romila Thapar. *Ancient Indian Social History. Some Interpretations* (Hyderabad. 1984). p. 5. p. 23. Thapar refers to an interesting analysis of the subject made by S. Gopal in a series of lectures delivered at Oxford (1960) on *The Intellectual Origins of Indian Nationalism*.

<sup>6</sup> *Ibid*, p. 8.

<sup>7</sup> \* It may sound strange or inconsistent that positivism should have, of all things, a moralistic foundation, a stern Protestant view of the nature of man positivism is frightfully attractive in contriving the misanthropic work ethic with the idea that science is strict demonstration and hence the opposite of speculation'. Joseph Agassi, *Towards a Rational Anthropology* (The Hague, 1977), p. 20.

<sup>8</sup> 'The students of the German Pietist August Hermann Francke, Bartholomaeus Ziegenbalg and Heinrich Pluetschau set up schools in Tranquebar in the eighteenth-century, whose objectives were the 'total transformation of mankind through education, which they saw as a means to create a 'universal realm of godliness'. Robert E. Frykenberg, 'Modern Education in South India. 1784-1854: Its Roots and its Role as a Vehicle of Integration under Company Raj', *American Historical Review*, 91 (1986), 37-65 (p. 41).

Khan also held that ‘... the only means of obtaining knowledge, conviction of faith is reason.... But when knowledge or conviction of faith is not based on reason then their achievements in any age or period of time are impossible’ (Ali, 1972). Ramchandra, in his newspapers *Fawaid-ul-Nazrin*, *Mohibb-i-Hind*, and *Qiran-us-Sadain* made innumerable references to these decaying religious orders. Having recourse to argument founded on scientific experiments and observations, Ramchandra tried to demolish the superstitions through rational arguments, and thereby attempted to present them objectively (Kidwai, 1961). Ramchandra writes about his preliminary attempts in this direction:

We were ambitious enough to imitate the plan of *The Spectator*. We first commenced a monthly, and then a bi-monthly periodical, called the *Fawaid-ul-Nazrin* ... in which notices of English science were given, and in which not only were the dogmas of the Muhammadan and Hindu philosophy exposed, but many Hindu superstitions and idolatries were openly attacked. As a result many of our countrymen, the Hindus, condemned us as infidels and irreligious.... (Jacob, 1902)

In an article published in *Fawaid*, Ramchandra discussed widely prevalent beliefs concerning Chalawa.<sup>10</sup> The scientific explanation goes as follows:

In villages, near ponds and places where water collects and tree leaves fall and decay, a gas is produced. This gas on coming into contact with air produces a flame of fire, which travels through the air for some distance. Such flames are sometimes encountered even in graveyards and cremation grounds where bones are

<sup>9</sup> ‘Quoted in K. N. Panikkar, p. 18.’ ‘familiarity with European history, institutions and languages and the concomitant influences of European ideas of liberty, rationalism and humanism acted as the *open sesame* which made Indians critical of their own institutions and which consequently led them to embark upon a career of reform’. K. N. Panikkar, Presidential Address to the *36th Session of the Indian History Congress*, Section II. December 1975, p. 3.

<sup>10</sup> Chalawa actually was a local term for deception widely prevalent in the North West Provinces of India.

collected in large numbers. And our few ignorant countrymen equate this phenomenon with a *Bhoot* etc.<sup>11</sup>

In his other writings, Ramchandra tried to impress upon the people the fraudulent basis of magic, and that to be a successful magician one needs to know a little physics. In his own words:

Anyone can organize such shows, given a knowledge of physics. And every observer will be convinced that the performer is a magician.... There are people who claim to have seen a *Bhoot* etc., and some of these people have never lied in their lives. But as a matter of fact, the things equated with a *Bhoot* can be explained as natural phenomena and nothing else.<sup>12</sup>

He also wrote a book entitled *Bhoot Nihang*, where he warned his countrymen against all sorts of superstitious beliefs.<sup>13</sup> All these efforts of Ramchandra did attract scorn and criticism of both Hindus and Muslims, yet a big section of the young Dilliwalas and also his students, joined him in this fight. One of his favourite students was Zakaullah, who later acquired fame as a mathematician, a prolific writer and translator of science textbooks and also a historian of great repute.

Munshi Zakaullah got exposed to modern science and scientific thinking after he joined Dilli College and came under the spell of his science teacher Master Ramchandra. I am not going to delve into his contributions to translations of science and mathematics textbooks or his history writings. Here I want to briefly reflect upon Zakaullah's faith in science and rationalism, which he carried forward from where his teacher Ramchandra left.

Zakaullah had actually internalised the ideology of scientism which had been gaining ground in Europe since the 17<sup>th</sup> century. Expressing his commitment he wrote, 'Science is that knowledge which has truth, an absolute truth and nothing but the truth'.<sup>14</sup>

<sup>11</sup> *Fawaid*. 12 October 1850.

<sup>12</sup> 'Fawaid'. 31 May 1847.

<sup>13</sup> 'Khutbaat Garcin de Tassy (Aurangabad. 1935). *Garcin de Tassy* was a French professor of Hindustani in Paris during the latter half of the nineteenth-century and was deeply interested in Indian culture, civilization and languages.

This scientism, which was reflected in most of Zakaullah's writings, clashed with the narrow-minded, tradition bound ideas of the East.<sup>15</sup> To keep abreast with the changing times, he advised people to look at ideas and facts through the prism of reason while simultaneously continue to respect their tradition.<sup>16</sup> He contested the contempt heaped on new values because, according to him, blind faith in conventions takes one away from the realisation of truth. And this truth for him was nothing else but science. This was a nineteenth century expression in scientific thinking, an incipient faith in science and the use of rational faculties to comprehend diverse aspects of our lives. We may find Zakaullah's almost blind conviction in science as naïve, yet it was a beginning to initiate a critical approach to understand the world.

Nazir Ahmad, a friend and fellow student with Zakaullah at Dilli College was not a student of science, yet he learnt to question everything inherited as tradition. The corridors of Dilli College reverberated with science which stirred Nazir Ahmad more than anything else. Suddenly, his beliefs were rudely shaken and his religious universe was contracted by the scientific and philosophical discussions, the questioning of inherited knowledge, and the critical scrutiny of the existing texts.<sup>17</sup> We know that scientific temper, as we understand it today, was not around during the mid-nineteenth century, however, such efforts could be seen moving in similar direction. We could see an urge to question the entrenched dogmas and the beginning of a critical gaze. Both Zakaullah and Nazir Ahmad also questioned the *maulvis* of Islam for their retrograde outlook. Nazir Ahmad remarked, 'Sadly the poor ulama were unaware of science, or modern knowledge'.<sup>18</sup> The extent to which the experience contributed to Nazir Ahmad's overall optimistic and energetic

<sup>14</sup> Munshi Zakaullah, *Gharbi Sharqi Tabiyat ki Abjadon par Mahakmat*, (Beginnings of the Physical sciences of the East and the West), Delhi, 1900, p.19.

<sup>15</sup> Rafat Jamal, *Zakaullah, Hayat aur unke Ilmi wa Adabi Karname*, Delhi, 1990, p.172.

<sup>16</sup> *Ibid.*

<sup>17</sup> Kidwai, S R, *Master Ramchander*, Delhi, p.49.

<sup>18</sup> Speech at Lahore, 1894, Nazir Ahmad, *Lekcharon ka Majmua*, Vol 1, p.587.



world-view, as it transpired, excessively so, is not easy to ascertain, but it certainly encouraged him to question some of the knowledge he inherited from his father and his teachers at Aurangabadi mosque (Hasan, 2005). These nineteenth century rationalists, if I may call them so, raised their concerns at a very rudimentary level. There were others, later in the twentieth century, who took this up in a more nuanced and organised way. Jawaharlal Nehru amongst them was surely the most prominent and consistent voice for the cause of scientific thinking and rationalism.

I will like to get back to Nehru to conclude my brief foray into the history of scientific thinking and rationalism in India. S. Gopal, the illustrious biographer of Nehru, felt that according to Nehru 'the spread of scientific knowledge would reveal the absurdity of such mental co-existence by strengthening the scientific attitude, which to Nehru was basically open-mindedness, the effort to search out the truth by experiment, not to believe in anything that could not be proved to be true nor to disbelieve anything unless proved wrong.'<sup>19</sup> While inaugurating a scientific institute in 1950 he made a remark which is alive and relevant even today, he said 'I find a curious hiatus in people's thinking. I find it even in the thinking of scientists who praise science and practise it in the laboratory but discard the ways of science, its method of approach and the spirit of science in everything else they do in life. They become completely unscientific.'<sup>20</sup>

After spending close to three decades in CSIR I can say with some close personal experience that Nehru failed in this mission or we failed to live up to that passionate Nehruvian spirit. He warned us repeatedly that dogmatism in religion or in any other field will inexorably lead to conflict. There can be many approaches towards the problems in life 'but certainly not the narrow-minded, dogmatic approach. We may have a scientist's approach, a humanist's approach and possibly other approaches

<sup>19</sup> Speech of Nehru in the Lok Sabha, 1 May, 1958. Debates, Second series, Vol.16, cited in Ibid.

<sup>20</sup> Jawaharlal Nehru, The Spirit of science, Opening of the Fuel Research Institute, Digwadih, April 22, 1950. *Jawaharlal Nehru's Speeches*, 1949-53, Vol. II, Delhi 1954, p. 366.

too, but the dogmatic approach inevitably narrows the mind and prevents us from seeing much that we ought to see.’<sup>21</sup>

Let me conclude with Nehru’s observations in his *Discovery of India* that ‘The scientific approach and temper are, or should be, a way of life, a process of thinking, a method of acting and associating with our fellowmen. The scientific temper points out the way along which man should travel. It is the temper of a free man. We live in a scientific age, so we are told, but there is little evidence of this temper in the people anywhere, or even in their leaders.’ (Nehru, 1991:512) Nehru wrote this during the colonial times, now we are an independent nation since the last seven decades ‘yet we are still a long way away from achieving that scientific outlook which Nehru considered so essential for our future well-being.’ (Narlikar, 2003:136)

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<sup>21</sup> Convocation address at the University of Ceylon, Colombo, January 12, 1950, in *Ibid.* p.424.