

## **Religious Reformation in the Bengal Renaissance: Prelude to Science Museums in India**

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In the history of mankind, “the Renaissance” signifies more than the period in European intellectual history with which it is commonly associated. It signifies the expansion of both mental and geographical horizons, and a free-spirited approach towards inventions which encouraged men to accept new ideas and to challenge old ideas and customs while rejecting subservience to fate. While the European Renaissance predates the modern sciences, the “Renaissance approach” is still perceived as a precondition for the inquisitive search for new knowledge that is associated with modern empirical sciences. The popular image of the European Renaissance is thus of a period when knowledge began to blossom. Europe was throbbing with passion for knowledge of the arts, as well as of the natural sciences.

The present chapter intends to employ the concept of “Renaissance” to highlight the preconditions for the development of science museums in India, where the intimate relationship between traditional belief and scientific enlightenment appears to have played an important role. This specific amalgamation can be termed as a notion of a new awakening or “Renaissance” which was the guiding force behind the growth of the Indian museums. I have analysed all these developments through surveys of leading Indian public intellectuals, and literature reviews on science exhibitions in museums of colonial India.

Also associated with “Renaissance” is the notion that people learnt to discover their inner being and their own worth, and therefore started taking more and more interest in whatever is human. This is the age of Humanism – the age of glorification of mankind as expressed in Shakespeare – *What a piece of work is man*. And man is considered to be the paragon of animals, the great poet concluded.

To establish human supremacy over the universe scholars gradually tried to make a synthesis of Humanism and the scientific spirit. The human spirit was striving to break the fetters of authority and tradition. In this new age, a revolution was taking place in the world of science, and the seventeenth century became the golden age of pioneer scientists like Galileo Galilei and Isaac Newton.

This new spirit of exploration and the acquisition of new knowledge knew no bounds. The waves of the oceans, which otherwise separate the east from the west, carried the new ideas to India, along with the power of arguments, and the messages of Rousseau, Voltaire and Mill. The famous Bengal Renaissance was a product of British rule, which tried to cultivate Western ideas into indigenous soil. Yet the drain of wealth that accompanied colonial rule contributed greatly to the growth and development of nationalist aspirations, which also played the role of a catalyst for the Bengal Renaissance. As eminent historian Sushovan Sarkar puts it:

The role played by Bengal in the modern awakening of India is ... comparable to the position occupied by Italy in the story of the European Renaissance.

The historic event known as “the Bengal Renaissance” had five distinct stages spanning the period 1815 to 1919. The first phase (1815–1833) witnessed the rise of the “father of modern India”, Raja Rammohan Roy, who contributed to a great extent to germinate the seeds of modernity in colonial Bengal. The second phase (1833–1857) marked Roy’s death and the outbreak of the famous Indian Mutiny. The third phase of Bengal Renaissance is characterized by nationalism and provided a platform for the establishment of the Indian National Congress (1885). The fourth phase was equally important as it saw the partition of Bengal in 1905. The Bengal Renaissance entered its final stage when nationalist leaders came to power.

Religious reformation in the context of the Bengal Renaissance is an important chapter in the socio-cultural history of Bengal. People in general did not know much about the Hindu Shastras and the Vedas and the Upanisadas – these were closed books to them, reserved for the priestly class, the Brahmins. To the people, religions consisted mainly in the conscientious observation of rituals, ceremonies and also of the rules and regulations of the caste system. This great emphasis on rituals

and ceremonies naturally resulted in the establishment of an undue influence of the Brahmin priesthood on society, and the priests, to perpetuate their influence, encouraged various superstitious rites in the name of religion. Belief in the efficacy of magic, witchcraft etc. also formed an important element of popular religion.

Two religious ideas that were of key significance in the Bengal Renaissance were the idea of the unity of Godhead and that of the symbolic nature of idol worship. However, these ideas were well known to the educated Hindus even before the advent of Rammohan Roy, as revealed in the work of Shakta poet Ramprasad (c.1723-1775) as well as that of Bharatchandra (c.1712-1760). Ramram Basu (1751-1813), one of the first Bengali prose writers, prefaced his book *Lipimala* (1802) with an offering of prayer to the Supreme Being, the creator, preserver and destroyer of the universe and source of all knowledge and success. Drawing on his experiences of the Christian missionaries who accompanied colonial rule, Rammohan emphasized the ethical and humanistic teachings of Christ and asked the missionaries to forget their dogmas and metaphysical theology.

Rammohan's religious reform movement had a clear social purpose, and the great reformer himself admitted this fact in many of his writings. Intellectual honesty compelled him to admit that the worship of idols, which he denounced vehemently, had been permitted for the uneducated and ignorant masses by the original Hindu Shastras. But at the same time he was quite clear in his mind that the traditional forms of Hindu worship encouraged the growth of various superstitions and immoral practices, helped the domination of the priestly class, and hindered the moral development of the common people.

Amongst the leaders of the Bengal Renaissance, Raja Rammohan Roy is always remembered for his achievements to create an environment in favour of enlightenment and rationalism. In Bengal, it was Rammohan Roy who first publicly voiced a critique of the medieval outlook on culture, religion and life as a whole. He and his followers welcomed the knowledge of Western science and philosophy and launched a campaign to introduce them in place of oriental education, an attempt which eventually failed. He also propagated the idea of imparting Western education to native Indians and was enthusiastic about science and technology. He promoted science over scholasticism. He raised his voice in favour of English education, but without discarding the

importance of Sanskrit. His Brahmo religion was based on monotheism, which questioned the efficacy of the traditional Hindu religion. Rammohan supported the cause of female education, although he did not get directly involved with it as Iswar Chandra Vidyasagar, another pillar of the Bengal Renaissance, did. He wanted to make his fellow countrymen more aware of developments in the wider world, for which he regarded knowledge of English as a priority. He himself was a brilliant scholar of Sanskrit and Persian, but he preferred English for its universal nature, and for its importance for acquiring knowledge about Western science and technology.

The early nineteenth century was marked by a hunger for knowledge about the science and technology of the Western world. Rammohan considered that this would help achieve democracy and a more comprehensive understanding of the world. Before 1835, science and technology were never included in the curriculum of schools and colleges. Rammohan Roy had advocated for their introduction in a letter to Lord Amherst (Governor-General of India from August 1823 to February 1828) in 1823. But it was not then considered by the colonial rulers. In 1835, Macaulay, a British historian who had propagated English education in India, finally decreed in his Minute on Education that government money would be spent on Western liberal education in humanities with a sprinkling of science in English. Rammohan Roy's valiant struggle had paved the path to modernisation and, more specifically, prepared the ground for a science museum. During the Middle Ages, the ancient sciences of India, including astronomy, mathematics, astrology, and medical science— (Ayurveda), had fallen somewhat into oblivion. But with the advent of western education, a positive attitude towards modern science gradually evolved in the minds of the newly emerging middle-class intelligentsia. Men like Derozio (1809-1831), Akshyay Kumar Dutta (1820-1886), Rajendralal Mitra (1824-1891), Trailokyanath Mukhopadhyay (1847-1919), Swami Vivekananda (1863-1902), Rabindra Nath Tagore (1861-1941) each played a particular role in this process.

Louis Vivian Derozio (1809-1831) was another important product of the Bengal Renaissance. His firebrand student group "Young Bengal" fought against *Satidaha* (widow burning), idolatry and bigotry for widows' rights to re-marry, and more generally for western education and progressive ideas.

Akshay Kumar Dutta (1820-1886) played a significant role in the teaching of science. He taught physics and geography at the Tattvabodhini Pathsala (founded in 1840). He strongly favoured the dissemination of scientific knowledge through the mother tongue. He was appointed as Headmaster in the Normal School (to prepare qualified teachers) and was in several ways engaged in the promotion of scientific studies. J. Lourdasamy introduces him with the following lines:

Akshay Kumar Dutta (1820-1886), who declared that India needed a [Francis] Bacon, presented science in highly religious terms while at the same time emphasizing the human mind's enormous capabilities in understanding the universe.

Dutta wrote *Bahya Bastur Sahit Manava Prakritir Sambhanda Vichar*, an exploration of divine purposes as expressed in the laws of nature.

Iswar Chandra Vidyasagar (1820-1891), an Indian social reformer, was a proficient Sanskrit scholar educated in the Sanskrit College. As an educationist, he had given considerable service to girls' education and the dissemination of science in his broader vocation. He shed light on the negative effect superstitions had on the advancement of modern science, and he campaigned vigorously against them. Like Akshay Kumar Dutta, he also emphasised the importance of the mother tongue in the communication of scientific knowledge. His efforts helped establish the vernacular schools, which would impart a complete course of elementary education, including *Elements of Natural Philosophy (meaning Chemistry and Physics) and Natural History*. In 1850, Vidyasagar published "Jivancarita", a vernacular scientific work containing biographies of torch-bearers of the modern scientific revolution including Copernicus, Galileo and Newton.

Keshab Chandra Sen (1838-1884) presented science in intensely religious terms. According to him, anatomy and physiology, geology and astronomy, chemistry and zoology were media for salvational wisdom. Though he was in the theistic Brahmo Movement, he hoped that in spite of the passing of the ages, all would

assiduously and reverently cultivate the sciences, study closely the scripture of nature, and worship in the vast cathedral of the universe, under the heaven's canopy, the Great Spirit who shines everywhere.

Sen played a significant role in the foundation of the Indian Association for the Cultivation of Science. He secured donations from Maharaja of Cooch-Bihar and other rich magnates for Mahendra Lal Sircar's project.

Swami Vivekananda (1863-1902), disciple of the Hindu mystic Ram Krishna Paramhansadev, has become famous for his Chicago oration in 1893. Vivekananda participated in the World Parliament of Religions, part of the World Fair on religion, science, art, law and human rights which took place in September 1893 at the Hall of Columbus, Chicago. His message of human oneness was appreciated by all and he spent over a year in the USA, during which time he was invited by learned bodies to deliver lectures on the Vedantic Philosophy of India).

Socio-religious reformers, writers and intellectuals like Michael Madhu Sudan Dutta, Bakim Chandra Chatterjee, Rabindranath Tagore and many other personalities emphasised science and rationality through their writings. Their works also highlighted the development in science and technology.

Michael Madhu Sudan Dutta, who has been called the torch bearer of modern Indian intellect, was independent and unorthodox, something which is reflected in his writings, for example in *The Slaying of Meghanada: A Ramayana from Colonial Bengal*, and *Nirbacita rachana*. He introduced *amitraksar* (a form of blank verse with run-on lines and varied caesuras) for the first time in Bengali literature, a form influenced by Shakespeare and Francesco Petrarch.

Bakim Chandra Chatterjee (1838-1894) was popular both for his writings and his role in the struggle for independence in colonial India. His *Bandemataram*, a lyrical song, became the anthem of the Indian National Congress. His excellence lies in sustaining the tune, which is built around a celebration of the marvels of science in bridging distances, expanding the horizon of knowledge

under the sun, and generating dynamism. He also encouraged his countrymen to step onto this path of progress, dissociating themselves from the old and slow tradition. As Chattopadhyay put it:

Look at the railways, and the engines which surpassing a hundred thousand of the horses of Indra in strength, make a month's journey in a day. Look at the ships ... The Babu who with a telescope observes the eclipse of Jupiter's moon, would, if he had been born fifty years earlier, have worshipped Jupiter with offerings of rice, bananas, incense and lamps.

In nineteenth century India, Darwin's theory of evolution was challenged, as explained by Pratik Chakrabarti:

Bakim's explanation of evolution based on the concept of Hindu trinity: creation, preserver and destroyer (Brahma, Vishnu, Maheswara) as opposed to Darwin's scheme. His attempt was to show that this trinity did not represent an opposition to science.

Bakim Chandra was writing regularly on subjects related to scientific interest for the Bengali journal *Bangadarshan*, thus helping to promote popular science. Like many other enlightened personalities he was also a strong supporter of medical practitioner Mahendra Lal Sircar's projects for the Indian Association for the Cultivation of Science (IACS, founded in 1867).

Rabindranath Tagore was a great representative of the East. His literary works and other writings display great versatility and wide knowledge. In the context of science he was very much moved by Darwin's Theory of Evolution. He wrote on what the Evolution Theory teaches us in *Vividha Prasanga* and *Jagatpira*. Tagore firmly believed that dissemination of science education to the people was an essential attempt to eradicate superstition. He also thought that science helped in bringing humanity closer together, and in transcending geographical barriers. At the same time he was aware of the wrong uses of science. According to Sasadhar Sinha, Tagore

firmly believed that the final social and economic salvation of India would come through the inculcation of the scientific spirit and employment of science in the service of the people.

Tagore was in contact with eminent scientists and nationalists like Jagadish Chandra Bose, Prafulla Chandra Ray, C.V. Raman, Meghnad Saha, Satyendranath Bose and so on. He also met Albert Einstein, Werner Karl Heisenberg and Arnold Johannes Wilhelm Sommerfeld. Tagore told Einstein, “Science is concerned with that which is not confined to individuals; it is the impersonal human world of truth.” Even in practical terms Tagore was an active supporter of scientific research, and he encouraged Jagadish Chandra in his research activities and helped him establish the Bose Institute by providing funds. Tagore was in charge of the Science section of the periodical *Sadhana*, and he contributed various articles on science, such as *Gatinirnayaner Indriya* (Indicators of Motion), *Ichha Mrtyu* (Suicide), *Utpakhir Lathi* (Kick of Camel bird), *Bhugarvastha Jal* (Underground Water), and *Vayupravaha* (Force of Wind).

### **Tradition of Science**

The propagation of science through the work of these intellectuals was an immediate outcome of the modern Bengal Renaissance. But it can also be argued that the tradition of science in India has ancient roots. Since the Harappan Civilization (ca. 3000–1500 BCE) for example, water management was highly advanced. The Sudarshan Lake was built in the late fourteenth century BCE (though it was repaired under Ashoka, the grandson of Chandragupta, in 150 BCE). Further evidence of advancing technological skills included pottery wheels, well-fired brick, and the cultivation of cotton. The people of the Indus Valley Civilization had great skill in sanitary engineering and were highly cautious about their hygiene and personal cleanliness. They used manhole covers to improve their sanitary system. Even the British borrowed the techniques of drainage and sewerage from them. Kautilya’s *Arthashastra*, a unique work, was a store of information on land and sea communications, agriculture and irrigation, ores and mining, plants and medicine, and mechanical tools or *Yantras*. In the field of astronomy, India had outstanding achievements. Indian astronomers created accurate calendars, and were thus able to calculate the precise timings of both the solar and lunar eclipse. India had made considerable progress in the

field of medical science, as recorded for example in *Charaka Samhita*, perhaps the best source of Hindu medical knowledge, which made no mention of surgery. But Susruta had taught and practiced surgery in Kasi. He was the eminent physician in ancient India and he had expertise on surgery around 600 B.C. His teaching and work is available in a treatise called *Susrata Samhita*. In the field of mathematics, the greatest achievement was the concept of zero. Different kinds of metals and alloys were used by the ancient craftsmen and artisans.

The medieval period also witnessed considerable scientific activities in India. Architecture, engineering and industry were remarkably developed. Delhi's renowned Iron Pillar in the Qutab Minar complex (dated 410 CE) was an example of metallurgical advancement.

Briefly stated, the argument put forward here is that India's pre-modern scientific and technological advancement was part of the general human history of science and technology, but by the time of the modern industrial revolution India was less advanced in the field of modern science and technology. But the message of the Renaissance was to urge the country to revive its old glory in the field of science and technology.

### **Institutionalizing Science**

The study of natural sciences under the auspices of the Asiatic Society, the Indian Association for the Cultivation of Science (IACS, 1878), and the Hindu College should be taken into account in this context.

The Asiatic Society of Bengal, where colonial officers could exchange ideas and research, was established in 1784. Their research and discussions were published in *Asiatic Researches*. In fact, *Asiatic Researches* granted only limited space to science. Though the society formed the Physical Committee (1808) to promote the study of natural history, it was much more interested in philological, anthropological and textual studies of the Orient. Instead the *Journal of the Asiatic Society* was started in 1831 and served as a platform for Indians to publish their scientific works. Works of eminent scientists like J.C. Bose (physics), P.C. Ray (chemistry), and Asutosh Mukherjee (physics and mathematics) were published in the journal.

The Indian Association for the Cultivation of Science was established (1878) by Mahendra Lal Sircar in 1878 with the aim of institutionalizing Indian interest in modern science as well as Western science. The fundamental object of the institution was to encourage India in scientific research and to popularize scientific knowledge. Satischandra Mukherjee's Dawn Society was founded in 1902 and its journal was a platform for the propagation of science. The Indian Institute of Science and the Bose Institute also played an important role in promoting science and scientific research.

The Hindu College was another important institution in modern India. It supported many intellectuals and academics and encouraged debates. In the case of natural sciences, the college made remarkable efforts. In 1835 the General Committee of Public Instruction, after an evaluation of the College, recommended the abolition of the professorship of science and the discontinuation of chemistry teaching. The recommendations were changed in 1843-44 when professorships in experimental and natural philosophy and civil engineering were introduced instead.

Apart from the above, the Calcutta Medical College (established In 1835) offered lessons to medical students by eminent scientists in botany, physics, and chemistry. .

### **Scientists in 19<sup>th</sup>-Century Bengal and Modern Science**

Sir Jagadish Chandra Bose (1858-1937) was the first modern Indian scientist. Bose was born in the district of eastern Bengal. He had opportunities to study in St. Xavier's School and St. Xavier's College in Calcutta; at Corpus Christi College, Cambridge; and at the University of London. After returning from abroad, he became professor of the Department of Physics in the Presidency College in 1884. His first ten years of research were devoted to the production of the shortest possible electro-magnetic waves and the verification of their quasi-optical properties. *Response in the Living and Non-Living* (1902) and *The Nervous Mechanism of Plants* (1926) are important books by Sir Jagadis Chandra Bose. He developed many kinds of instruments through his experiments. During the second phase of his work (1899-1902), he demonstrated some interesting correlations between the living and the non-living world. According to J. Lourdasamy,

Thus, in this phase, Bose tried to break the monopoly of the West in laying down the canons of research and sought to widen the world view of modern science.

During Bose's last phase of research, he posited the plant world as the progressive connecting link between the inanimate and the animal world. In 1917, he founded the Bose Institute for the advancement of science and the diffusion of knowledge. In addition to all his experiments, in a public demonstration in Calcutta Town Hall, he ignited gunpowder at a distance by sending electromagnetic waves from within the hall. The stunt showed the potential uses of remote wave signals, which at the time was a pioneering contribution. But just one year after the demonstration, Guglielmo Marconi's work became public. Jagadish Bose was excluded from the Nobel Prize for Physics in 1909 for the development of wireless telegraphy while Guglielmo Marconi and Karl Ferdinand Braun were jointly awarded the same. Bose simply did not apply for a patent. It was common in India at that time to believe that scientific discovery was not for the scientist's material benefits but for the advancement of society and humankind. Bose was no exception in this regard.

Another scientist of international fame was Acharya Prafulla Chandra Ray, a chemist and industrial entrepreneur of India, born in 1861. He had opportunities to study in Albert School and the Metropolitan Institution, Calcutta; and at the Presidency College, University of Edinburgh. After obtaining his doctor's degree in chemistry from Edinburgh, he came back to India and became a professor at the Presidency College. He worked until 1937 at the University College of Science as professor and afterwards as professor emeritus. He was inspired by the lives of Newton and Galileo. At the same time he clearly supported the activities of Brahmo reformers such as Keshub Chandra Sen, Debendranath Tagore, and Akshay Kumar Dutta. Like Rammohun Roy he also felt the importance of modern science for the advancement of the Indian intellect and society as a whole. He endeavoured to make his science directly relevant to the requirements of society. Bengal Chemical and Pharmaceutical Works Ltd. was established by him and it helped in providing employment and self-sufficiency to many. The enterprise played an important role in putting scientific knowledge to immediate industrial use. He had a profoundly positive understanding of the importance of science both in intellectual and material terms. To him, the study of science was the tool to liberate younger generations. A contemporary of Sir Jagadish Chandra Bose, he was

very much concerned with the direct implications of modern science for the material benefit of society. P.C. Ray also believed that prejudice and unreason are never helpful to human progress:

Prejudice, bigotry and unreason have been the greatest enemies to human progress throughout the entire course of man's history; and the baneful and soul killing effects of authorities and dogmas have been the most terrible in stunting the growth of human mind.

Ray always remembered the early Indian scientists and their contribution to the ancient Indian sciences as well as world science. His research work, entitled *A History of Hindu Chemistry*, served as stimulation and legitimization for the contemporary pursuit of modern science.

To the British, India in the nineteenth century was considered to be the ideal place for a certain kind of scientific research. According to Jyan Prakash,

It provided a rich diversity that could be mined for knowledge and as a colony, offered the infamous 'elbow room' for an unhindered pursuit of science.

George Campbell, the Governor of Bengal and a noble colonial ethnologist, remarked in 1886:

In fact, it is now evident, that this country in a far greater degree than any other in the world, offers an unlimited field for ethnological observation and enquiry, and presents an infinity of varieties of almost every one of the great divisions of the human race, so also, there is no lack of able and qualified men to reap this abundant harvest.

But at the same time as India provided a rich field of research, the spread of science faced obstacles. In the eyes of the reformers, Indian society of the mid-nineteenth century was marked by some obscure religions, rituals and superstitions – the caste system being a case in point. Utter ignorance pervaded society and prejudices obstructed the development of human conscience, tender emotions and the urge to honour one's own self as a human being. As Gyan Prakash rightly observes,

If the emergence of science in the late nineteenth century as a sign of western power constituted the “native” as an object of scientific discourse, the enactment of this process displaced the representations – Western Science versus “native superstitions” – of colonial domination.

The process of enunciation, is as evident generally ambivalent. The history of science framed in museums and exhibitions in British India is no exception to this. There was a split between the subject of representation of India by Western science and the process of hybridization and differentiation by which it was signified. Gyan Prakash continues:

As a result, neither the status of science as Western nor its separation from the Indian could be maintained – European knowledge and institutions emerged pursued by the shadow of its colonial birth.

... an Indian elite could emerge as knowing subjects neither blinded by “superstitions” nor endowed with a scientific gaze but with another sight.

Along with the performance of science in nineteenth-century India, the supposedly ignorant and un-teachable subalterns proved to be no less open to scientific enlightenment through museum exhibitions. Museums aimed to make objects speak a language revealing an order which might be received in full by the ignorant laymen of India. Gyan Prakash therefore came to the conclusion,

In the emergence of [the] subaltern, then, there appears another, “third” view of the performance of colonial science – one that addresses the general issue of how the staging of science realigned colonial categories.

In India, the museum movement started with the establishment of the Asiatic Society in 1784. Since then the Asiatic Society has been working in various fields of research. In 1798, Dr. J.B. Gilchrist hired a building to house a library and museum, and was strongly devoted to the project. But due to scarcity of funds it was delayed until on May 15, 1805 a formal application was made to the government and the site was granted to the Society (J.N. Harrington, V.P. of the society proposed the corner of the Park Street and Chowringhee Road for the Society’s house and it was seconded

by H.T. Colebrooke). In 1814, Dr. Nathaniel Wallich proposed that the Society should have a museum and the Society accepted his proposal on February 2, 1814 to form a Museum with two sections, Archaeological-Ethnological and Geological-Zoological. The Society opened its Art Gallery in December 1814. In May 1862 the Society decided to establish a public museum, which was to be the Indian Museum of Calcutta (Kolkata). The museum building was constructed in 1875 and opened to the public on April 1, 1878 with art objects, objects of natural sciences, geological specimens etc. After the establishment of the Indian Museum, the Madras Museum and the Central Museum (Nagpur) were established with natural science collections.

During colonial rule, the British government organized an industrial trade fair in Pune to promote their products in 1893, and the displays were gradually transformed into the country's first science museum, namely the Lord Reay Museum (Pune). Unfortunately it was closed down, though some of the exhibits are now kept at the Mahatma Phule Museum in Pune. In 1906, the Forest Research Institute, formerly known as the Imperial Forest Research Institute, was established for the purpose of promoting study and research on forest science. It also houses a number of museums such as the Siviculture Museum, Timber Museum, Social Forestry Museum, Pathology Museum, Entomology Museum, Non-Wood Forest Products Museum. The very existence of these informal endeavours of science object display and preservation proves that there was a congenial environment for future formalized science museums.

The museum movement, and particularly the science museum movement, in India began with the establishment of the National Physical Laboratory (Delhi) and the Birla Institute of Technology and Science (Pilani). The former was closed down but the latter continued. More museums followed, with the Birla Industrial and Technological Museum opening in 1959 in Kolkata, the Visvesvaraya Industrial & Technological Museum in 1965 in Bangalor), and the National Museum of Natural History in New Delhi, 1978. The National Council of Science Museums was founded in 1978 with its headquarters in Kolkata.

If the Indian Museum of Kolkata was the first museum in India (1814), then Birla Industrial & Technological Museum (B.I.T.M.) was also the first of its kind. In the dawn of national freedom, Indian political leaders were conscious of the fact that to cope with the gigantic problems of

economic development, the nation had to find its place in this age of science. Dr. B.C. Roy, having been moved and inspired by the Deutsches Museum, was the first to propose this idea of establishing a museum to keep the nation in the line with global developments in science and technology. B.I.T.M was established in 1959 at 18 Store Road (now 19A Gurusaday Dutta Road) in a glamorous building that was constructed for the purpose on a historical site previously owned by the Tagore family.to .

A major achievement of the Nehru era (1947–64) was in the fields of scientific research and technological education. Nehru was certain that science and technology were crucial to the solution of the country's problems. In 1938, Nehru expressed his thought to the Indian Science Congress that problems of hunger, poverty, insanitation, illiteracy, superstition, starvation etc. can only be solved by science.

This perception was reiterated in the Scientific Policy Resolution passed by the Lok Sabha (Parliament) in March 1958, acknowledging the role of science and technology in the economic, social and cultural advancement of India. Jawaharlal Nehru was aware of the significant role that scientific research and technology would play in India's development and protection. After Independence, science policy was formulated to develop intellectual ability and a science tradition. But it is regrettable that an elite group emerged in isolation from society at large, feeling no urge to disseminate knowledge to others. And thus a new class of keepers and controllers of knowledge has prevented the expansion of basic learning about science and technology, and given way to bureaucracy. In this context, it is worth examining the three Five Year Plans.

**First Five Year Plan (1951-56):** As mentioned, science and technology have been considered to be of national importance since the era of the first Indian Prime Minister, the late Pandit Jawaharlal Nehru. On 4<sup>th</sup> January 1947 the foundation stone of the first National Laboratory, namely the National Physical Laboratory, was laid as a part of the effort to promote self-sustaining scientific and technological growth and development. The First Five Year Plan intended to set up a scientific infrastructure including new national laboratories and research institutes; translating results of scientific research into commercial production; and training personnel for research institutes and industries.

**Second Five Year Plan (1956-61):** After setting up various laboratories, the primary task was to strengthen research facilities, coordinate research programmes with the requirement of national planning, and encourage more and more research works at regional and state level during the Second Five Year Plan. Dr Najma Heptulla writes,

The plan also aimed at devoting sufficient attention to fundamental and applied research and linking it with the problems of industries falling within the sphere of various national laboratories.

**Third Five Year Plan (1961-66):** Efforts were made to strengthen the existing research institutes and to expand research activities, for example by developing and manufacturing scientific and industrial instruments, introducing research scholarships and fellowships; and coordinating research work carried out by various national laboratories, universities, technical institutions and research wings of government departments. During the period of Nehru, seventeen national laboratories were established specializing in various types of research, and Nehru became the chairman of the Council of Scientific and Industrial Research. Both the national laboratories and other scientific institutions were guided and financed by the Council of Scientific and Industrial Research.

These science museums and centres have played an important role in communicating science in a non-formal mode as well as in supplementing social science education. The museums encourage visitors' participation by displaying interactive exhibits to witness and understand the process of science. In general, the objectives of these museums are as follows:

- To collect , restore and preserve significant historical objects
- To portray science and technological development
- To promote science and technology in both urban and rural areas
- To supplement science education in formal education centres like schools and colleges
- To train teachers in the use of scientific teaching aids To support schools, colleges, universities and technical institutions

- To design, develop and fabricate prototype exhibits

## Conclusions

At the beginning of the paper the Renaissance and its effect in India were discussed. The Bengal Renaissance was the key instrument to fight for truth in all corners of knowledge. A group of enlightened people entered public society and their contributions in different fields were significant in the process of human progress. Rammohan Roy and his contributions in the field of science and technology is worth mentioning. He represented a fine blend of spirituality, rationalism and humanism. In other words, he tried to justify the tenets of religion in the light of modern rational beliefs. His activities in Brahma Samaj were clear examples of his reformist zeal and enlightened mind). According to David Kopf, Rammohan's approach to religion, society and ethics was "new and radical". He further commented, "It was a pioneering faith that emerged out of the changing conditions of the nineteenth-century world. It challenged many of the features of traditional societies." Akshay Kumar Dutta and T.N. Mukherjee were also in that group and their contributions in the field of museology were remarkable. A religious person, Akshay Kumar Dutta had a keen interest in mineral, geological objects etc, and he was a great collector of such items. He regularly visited the Indian Museum's mineral section. He even had a small museum containing rare plants in his house. T.N. Mukherjee (1847–1919) was another of the pioneering museologists of our country. He was known as a humorous writer but he had a significant background in the field of museums. He curated many exhibitions in different parts of the world and played a pioneering role in recording all kinds of crafts and agricultural products. One of his important contributions was in the management of the arts in India. During the Jubilee celebrations for Queen Victoria he was appointed Chief Reference Officer for Indian crafts by the Indian government. While in the UK he reorganized the displayed collection of the Indian Institute at Oxford. Some of his works on plants were in Melbourne University. He was employed as Deputy Curator in the Indian Museum, and played an important role in developing an Art and Industrial Section there. This gave an impetus for the museum to begin displaying science and industrial objects as well as art.

We have to acknowledge that developments in science and technology heavily influence the shape our society takes and can precipitate significant events of global importance. To eradicate

superstitions and orthodoxy and to fight against obscurantism of all kinds, the country needs to develop a scientific attitude, which requires the popularisation of scientific methods and culture. The achievement of proper understanding of the basic principles of science can increase the confidence and self-reliance of the people while also imparting pleasure and benefits. There is an ever-increasing need to encourage public understanding of science and technology in the developing country.

To what extent the Bengal Renaissance played a direct role in the emergence of science museums may be a matter of interesting discussion and study. The overall effect of the Renaissance was to increase the impetus to understand the unknown and to search out the truth. Socio-religious reformation of our country pushed society forwards towards rational thought, the fight for progressive ideas and the embrace of scientific knowledge. The more scientific discoveries were made, the more scientific articles were published, the more scientific instruments were manufactured, and the more science was cultivated – the more urge to build science museums was felt, and thus a number of science museums came into existence.

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### **About the Author**

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