



The challenges met by Indian scientists under British rule

Swarupa A. Salvi

Chemistry Department

Sathaye College (Autonomous)

Mumbai University.

Abstract: As British considered themselves as Nordic race and supreme, they believed that the black Indians cannot absorb modern scientific knowledge. So the educational and scientific institutes started during 19th century were purely for their own benefits. The higher positions in them were not offered to Indians. In 1823, Ram Mohan Roy asserted British Governor to encourage liberal, modern scientific education in India. This resulted in formation of Medical College of Bengal in 1835, University of Calcutta in 1857, and St. Xavier's College in 1860 in Calcutta. But due to lack of modern facilities, the Science taught there was substandard. It was the efforts of Indian scientists that promoted modern science in India. In 1868, Dr. M.L. Sircar, graduate from Medical College of Bengal, started Calcutta Journal of Medicine to facilitate Indian medicine. In 1876, he formed Indian Association for Cultivation of Science. In 1885, Prof. J.C. Bose became the 1st Indian Professor in Presidency College, Calcutta. But he was paid less salary than British Professors. He never took that salary and continued teaching till retirement to recover Indian pride. His research papers were published in proceedings of Royal society only by intervention of Lord Rayleigh. In 1889, after joining Presidency College as Assistant Professor, Acharya P.C. Ray slowly established a research laboratory there. His efforts initiated chemical industries in India from 1901. The collective visionary, nationalist thinking, undeterred efforts of Dr. M. L. Sircar, Prof. J. C. Bose, Sir. A. Mukherjee, Acharya P.C. Ray, Dr. C. V. Raman, Dr. S. N. Saha, P. C. Mahalanobis, Dr. J. H. Bhabha and others after 1900, helped India to progress in science after independence.

Key words: Nordic, journal, visionary, undeterred

Introduction: Studies have shown that the Indians excelled in all the types of sciences and mathematics in ancient and medieval India. [1] The Britishers entered in India in 1608 purely for the purpose of trade. But slowly established their rule in India. After winning the battle of Plassey in 1757, slowly Calcutta became capital city to Britishers. Till 1818 they captured almost entire southern India. But during their rule, they never considered of imparting good education to Indians.[2] Due to the white supremacy belief they looked upon Indians as blacks and incapable of grasping good education. [3] The education given to Indians was of low grade, just sufficient to become the translators of local knowledge to English or becoming babus. The science and math taught was substandard. The good school, colleges and educational institutes were started after 1820 due to Ram Mohan Roy's efforts. Mostly these schools were started in Calcutta Province. The rest of the India was still receiving education in local languages, majorly Sanskrit and Urdu. [4] Also the facilities available for performing scientific work were few. The scientific journals for publishing the work were majorly European. So, one of the biggest challenge to the Indian scientist was publishing their work in modern European journals. [5] The Indian Journals were started only after 1850. The research papers published in European journals by Indians needed interventions by British scientists. The Indian intellects were not given equal positions and salaries in educational Institutes. But despite all these difficulties, they did not deter the job of spreading modern science. This resulted in growing scientific activities from 1920 and establishment of pioneer research organizations like CSIR. [6][7]

Objectives: 1. Review of the indirect contribution of Indian scientists before independence, in freedom fighting and nation building after independence.

2. Assessing the difficult and challenging time experienced by them in 100 years prior to independence.

Methodology: The research methodology followed is Secondary data analysis. In present work, seven research articles related to the progress of science and technology in India under British rule are reviewed.

Discussions:

Among the early civilizations, Indian civilization is found to be scientific. The ancient Indians were shown to have interest in mathematics, especially Geometry and Astronomy. Aryabhata I, Brahmagupta, Varahmihira, Apastamba, Baudhayana, Katyayana, Manava, and a few others are the famous scientists from ancient India. Ayurveda is the science of treating and healing through herbal medicine is originated in India. Today it is more popular worldwide due to its no side effect character. The temples built in different time period right from ancient times are proofs of engineering knowledge of Indians. Vedic literatures find mention of earth's shape, different rivers which shows knowledge of Geography in Indians. During medieval period of Indian history, the knowledge of metallurgy, extraction of metals from ores, Chemistry and other natural sciences was translated from Sanskrit to Arabic and vice versa. This shows that India is a scientific country right from ancient times.

The educational system in India included Gurukul tradition where students spend their early stage of life staying with Gurus. The problem that during medieval period these traditional Gurukuls did not transpire into good educational institutes nor the students were sent abroad for higher education. So when British started ruling India, the education was imparted majorly in Sanskrit and Urdu.

After defeating Nawab of Bengal in Plassey in 1757, slowly Calcutta became capital city to British rule. Till then of state sponsored scientific activities like mapping, activities of voluntary organizations, health care facilities for Britishers were the only modern science related activities in India. In 1784, world's first Institute for study of Asia, "Asiatic society of Bengal" was established by some group of British civil servants. In 1817, "Hindu College" which later on named as Presidency College was started by David Hare, Ram Mohan Roy and other dignitaries of Calcutta. This was the first College to Indians for learning English and other Indian languages, European and Asiatic science and literature. The "Serampur College" was second institution opened in 1818 by Britishers for propagating of Theology and European science.

In 1823, Bengali reformer Ram Mohan Roy realised the importance of learning modern science in self-reliance. In his memorandum to the Governor General, he asserted to encourage liberal, modern scientific education in India.

In 1834, the Wilson School at Bombay and in 1837, the Madras Christian College was started by Christian missionaries. To reduce the high cost of bringing medical staff from Britain, it was decided to train locals for the help. So, in 1835, the first Medical College of Bengal was set up. Later on Madras Medical College (1835) and Grant Medical School (1845) were started.

Due to Nordic approach and white supremacy thinking of Europeans, they never considered Indians as equals. They always looked upon Indians as black, inferior and incapable of absorbing modern science. So the higher positions were never offered to Indians. The students graduated from these colleges were appointed as sub-assistant surgeons.

In 1857, three Universities at Calcutta, Madras and Bombay were established by British Government for systematic education. But the facilities required for the scientific studies were limited there. Few astronomical observatories were started at Madras, Poona and Calcutta by some British astronomers for their own interests. Few engineering Colleges were started between 1848-1854 to train the students and serve in Public Works Department.

In 1868, Dr. M.L. Sircar, graduate from Medical College of Bengal, started Calcutta Journal of Medicine to facilitate Indian medicine. In 1871, he put forth the scheme for Indian Association for Cultivation of Science where young Indians can get facilities to perform scientific research. In 1876, he formed Indian Association for Cultivation of Science by raising funds privately.

Prof. J. C. Bose who was initially a Physicist, graduated from St. Xavier's College, Calcutta in 1879. He completed BA from Cambridge and BS from London University in 1884. There he came in association with lord Rayleigh. In 1885, he returned in India and he was appointed as Professor of Physics in Presidency College, Calcutta through Viceroy Lord Ripon's intervention. So his placement as Professor did not come easily. Thus He was the first Indian Professor in any British Institutes. In 1896, he got D.Sc. from London. He

started giving Friday evening discourse at Royal Institution London. He was the first Indian to get this honor. Till 1898, He published 13 research paper. 7 of his papers were published in the proceedings of Royal Society on recommendation of Lord Rayleigh. Bose studied the parallel behavior of living and non-living in the electric wave. But his work was not accepted by modern science. In 1903, he turned to plant physiology and made small devices to record the plant responses. At Presidency College, he was given 1/3rd salary than a British professor. So he did not take any salary and taught till his retirement to recover Indian pride.

Acharya Sir P. C. Ray was a Chemist who completed BSc and DSC from University of Edinburgh. He received Hope prize for his thesis. In 1888, after returning in India, he joined Presidency College, Calcutta as Assistant Professor. There he slowly established a research laboratory. In 1892, he started Bengal Chemical works with capital of 700INR. This marked the start of Indian industry and hence he is known as “Father of Indian Chemistry”. Then he started Pottery works, the Calcutta soap works, and Bengal canning and condiment works. The profit earned was spent as stipend and scholarship to young researchers. To promote traditional Indian culture, Prof. J. C. Bose and Acharya Sir P. C. Ray abandoned the western dress. He published two volumes of History of Hindu Chemistry, 1st volume in 1902 and the 2nd in 1908. He published around 150 research papers in area of Chemistry. In 1916, after retiring from the Presidency College, he worked in Calcutta University for 20 years. In 1920 he was selected as the President of Indian National Congress. He was a passionate social worker and wished to use science for the up-liftment of poor.

Sir C. V. Raman was a Physicist who passed BA in 1904 and MA in 1907 from the Presidency College Madras. He joined Indian Finance Department in 1907 but simultaneously carried out his research at Indian Association for Cultivation of Science. In 1917 he joined Calcutta University. In 1928, he discovered a radiation effect for which he got the Noel Prize in 1930. He started many Research Journals for Indian young researchers. Because of his strong nationalistic sympathies he rejected the knighthood earned in 1929.

Sir Ashutosh Mukherjee was a mathematician. He was the first student who was awarded dual Master’s degree in Mathematics and Physics. He was appointed as Vice Chancellor to University of Calcutta from 1912.

Sir M. N. Saha was an astrophysicist, who developed Saha ionization equation. He helped in formation of Physics Department at Allahabad University, institute of Nuclear physics in Calcutta. He realized the importance of network of modern research facilities. He was member of Planning Commission of Indian National Congress. In 1935, he started Science and culture Journal. In 1942, he became chartered member of CSIR. In 1951, he was elected to Lok sabha as independent candidate.

S. N. Bose was a mathematician and Physicist. He was graduated in Mathematics from Presidency College Calcutta in 1913. He studied MSc in University of Calcutta and passed it in 1915. He worked with Albert Einstein on Bose-Einstein condensate.

Dr. H.J. Bhabha was a nuclear Physicist, he was learned in Cambridge. In 1939 he accepted the Readership at Indian Institute of Science, Bangalore.. In 1942 he became Professor of Cosmic ray Physics He argued for the development of science and technology in India. He in 1944 proposed Tata Trust for Establishing TIFR.. In 1948 he was selected as chairman of Indian atomic Energy commission. He successfully made agreements with UK, Canada, France for assisting Indian atomic energy Programme.

Conclusion: The efforts of all the scientist under unfavorable time of British rule made strong foundation of Science and Technology in Independent India. The pioneer institutes like TIFR, UDCT (now ICT), AERC (now BARC), IISc etc. which were established before freedom are still the active centres of scientific Research. So, although the scientists did not participate in freedom struggle directly, they have an important contribution of nation building.

References:

1. History of Science and Technology in India, DDCE/History (M.A)/SLM/paper, Dr. Binod Bihari Satpathy
2. Indo-European Encounter and Features of Modern Science in Pre-Colonial & Colonial India, A K Bag*, Indian Journal of History of Science, 53.4 (2018) T1-T20
3. How Evolution was used to Support Scientific Racism, Lindsay Pressman, Trinity College, Hartford Connecticut The Trinity Papers (2011 - present) Trinity Publications (Newspapers, Yearbooks, Catalogs, etc.) 2017
4. The Character of the introduction of the Western Science in India during 18th and 19th Century, S. N. Sen, Indian Association of Cultivation of Science, Received July 16, 1966
5. Subrata Dasgupta: Bose and Indian Response to Western Science, Oxford University Press, New Delhi, 1999 pp 309

6. Pioneer Scientists in Pre-independence India, William A. Blanpied, Physics Today, May 1986

7. Influence of Freedom Movements on Scientific Research in India, NPTEL – Humanities and Social Sciences – Science, Technology and Society

