

DR. CHUNILAL BOSE - A NEARLY FORGOTTEN MEDICAL CHEMIST AND SCIENCE POPULARISER OF BENGAL

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Dr. Chunilal Bose (March 13, 1861-Aug. 3, 1930) was a highly acclaimed medical chemist and a revered science populariser. An M.B. from the Calcutta Medical College, he served the Chemical Examiner's Department of the CMC, Bengal Medical Service throughout his life. He made immense contributions in both medical science and science popularisation. He earned many accolades like Rai Bahadur, FCS, ISO, CIE, etc. Since this stalwart has regrettably gone nearly into oblivion, an abridged life sketch of Dr. Bose is presented herein.

Dr. Chunilal Bose, a contemporary of Acharya Prafulla Chandra Ray and Acharya Jagadish Chandra Bose, was an award-winning medical graduate, a brilliant chemist and a pioneering science communicator in the late 19th and early 20th centuries¹⁻³. In medical science, he made admirable contribution in the fields of food adulteration, food poisoning, diabetes, poisons and toxins, small pox, forensic science, etc. More importantly, he was a pioneer in public health awareness movement, preaching for the benefits of sanitation, hygiene and balanced diet especially in rural Bengal. He was also a crusader against the use of narcotics.

In recognition of his contributions, the British Government conferred on him the title of 'Roy Bahadur' in 1898. But alas, even such a highly acclaimed scientist, a dedicated science communicator, an ardent social reformer and a prolific author has almost gone into oblivion even to the Bengalis. His 160th birth anniversary in 1921 went largely unnoticed, and his life and activities are missing from the curricula in schools and colleges. A travel down the memory lane is, therefore, all the more necessary to kindle interest in the biography of Dr. Bose amongst the younger and the older generations alike. The present write-

up, a sojourn in the life and activities of this towering personality, is a humble attempt to accomplish this task.



Rai Bahadur Chunilal Bose, M.B.,
F.C.S., I.S.O., C.I.E., Rasayanachariya

Birth

Chunilal Bose was born on the 13th March, 1861 to Denonath Bose residing in Shyambazar. He was the second son of his father. His ancestors hailed from the village Changripota (near Harinavi), South 24-Parganas.

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Education

Chunilal Bose had his early education in Shyambazar Anglo-Vernacular School (an upper primary school), Metropolitan Institution (Shampuker Branch), Northbrook School (where he received his first English education) and passed the Entrance Examination in 1877 from the Sanskrit Collegiate School. Pertinently, he became the President of the Shyambazar Anglo-Vernacular School in the 1920s. After passing the First Arts Examination from the General Assembly's Institution (known as Scottish Church College since 1929), he became a medical student in the Calcutta Medical College (CMC) in 1880. Since his father was facing financial hardship at that time, Chunilal had a tough time to medical education. He became a medical graduate in 1886 and passed the first and the final M.B. Examinations in the 1st Division with Gold Medals in Botany, Medicine and Pathology and Honours in Anatomy, Clinical Medicine, Clinical Surgery, Hygiene, Medical Jurisprudence, Midwifery and Surgery.

Career

Dr. Bose served the CMC in the Bengal Medical Service throughout his career. In 1886, he joined the CMC as an Assistant Surgeon. In 1887, he became Assistant Chemical Examiner to the Bengal Government and Assistant Professor of Chemistry in the CMC. He became Additional Chemical Examiner in 1894 and the Chief Chemical Examiner in 1915. In between, Dr. Bose officiated as the Chemical Examiner and Professor of Chemistry in the CMC. He served the Bengal Medical Service for more than 34 years. Pertinently, it is Dr. Bose along with the then Curator of the Indian Museum, Calcutta who certified the chemicals of the then newly established Alembic Chemical Works of Bombay as 'possessing the highest chemical purity' after the exhibition of Alembic products in the 1906 Calcutta National Exhibition.

Marital Information

Chunilal Bose married Tilottama Devi, the eldest daughter of Gour Kishore Sircar of Howrah, in 1882. He had two sons and two daughters. One of his sons, Dr. Jyoti Prakash Bose, a distinguished Indian endocrinologist, was credited with the first use of insulin (discovered in 1921) to treat type 2 diabetes in India (1923) in the School of Tropical Medicine, Calcutta.

Publications

Jyoti Prakash did yeoman service to the scientific community by publishing most of the articles written by

his father, either singly or jointly with others, in scientific, medical and other journals in a book titled 'The Scientific and Other Papers of Rai Chunilal Bose Bahadur' (Vol. I: 1924; Vol. II: 1925)^{2,3}. The articles were grouped, based on their contents, under the heads: Chemical and Pharmacological, Medical, Medico-legal, Industrial Chemistry, Hygiene and Public Health, Temperance, Popular Scientific Lectures and Miscellaneous, arranged in their chronological order.

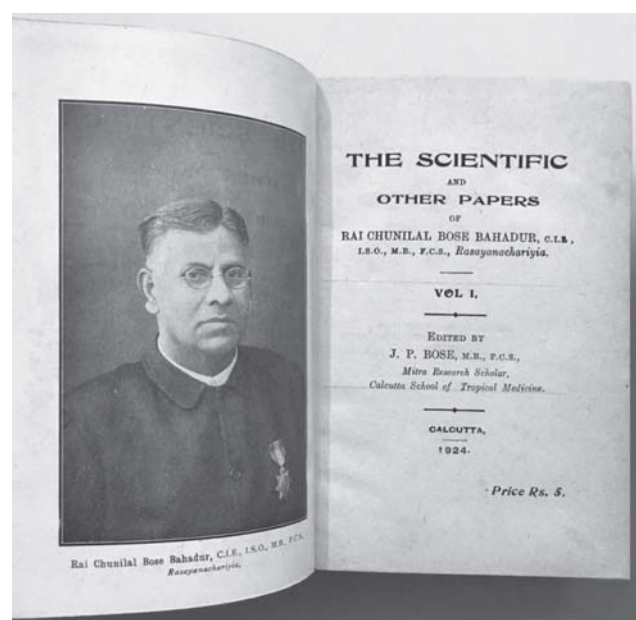


Image of J.P. Bose's book, Vol. I, 1924

The first volume began with a brief life sketch of Chunilal Bose. The number of articles dealt with in this volume are 8 (Chemical and Pharmacological), 3 (Medical), 12 (Medico-legal) and 2 (Industrial Chemistry). Some of these have been discussed in various subsections below. Suffice it to state that a Reviewer (*Indian Medical Gazette*, 1924) of this volume commented: "There is a wealth of carefully collected and observed facts in the book, an account of much original research work, and above all, medico-legal case histories, notes and information of the greatest value to civil surgeons and medico-legal workers in India. ... we trust that it (this book) will have a wide circle of readers⁴."

The second volume of the book deals with 'Hygiene and Public Health', 'Temperance', 'Biographical Sketches', 'Popular Scientific Lectures' and 'Miscellaneous' (social problems). Topics like Measures to prevent food adulteration, Common Indian foodstuffs, Practical hints on the dietary of Bengal, Milk Supply of Calcutta, Infant mortality in India, Health of Bengali college students, Drink

and Drug traffic, Problems of dowry during marriage of Bengali girls, Professional Beggary, etc. were dealt with in this volume. In the section of Biographical Sketches, Dr. Bose wrote about the biographies of Sir Jagadis Chandra Bose and Dr. Mahendra Lal Sircar, the founder of the Indian Association for the Cultivation of Science (IACS).

A Reviewer (*Indian Medical Gazette*, 1926) of the second volume of the book wrote, “*Together they form an important, non-technical and thoughtful contribution to many of the most important public health and social questions of the day in India. ...It presents the mature views and opinions of a brilliant and widely educated Indian savant and thinker, thoroughly familiar with the many and important questions with which he deals, free from prejudice, but filled with ambition for the betterment of the condition of the people. Its informative value is very great*”⁵.

Dr. Bose as a Scientist

In his long and distinguished career in the CMC, Dr. Chunilal Bose made many notable and significant contributions in science, mostly medical science - Analytical Chemistry, Pharmacology and Forensic Medicine. His research outputs were published in *The Indian Medical Gazette*, *Calcutta Medical Journal*, *Transactions of the Chemical Society of London*, *British Medical Journal*, etc.

Amongst many of his contributions in scientific research, only three are presented herein, which are likely to be of interest to the Chemists dealing with Natural Products. In an article titled ‘Note on certain reactions of an alkaloid contained in the roots of *Rauwolfia Serpentina*, Benth.’ with Surgeon-Major C.J.H. Warden, M.D., I.M.S. (Chemical Examiner to the Bengal Govt., under whom Dr. Bose was appointed in the CMC in 1887) as the co-author (J.P. Bose’s book, vol. I, pp. 19-25), he reported the isolation of an alkaloid, provisionally named ‘pseudobrucine’, as an acid-soluble, cinnamon-coloured powder which was extremely bitter and showed a green fluorescence in solution in amyl alcohol and in chloroform. Its physiological properties were also studied (C.J.H. Warden and Chunilal Bose, *Pharmaceutical Journal*, Aug. 1892).

In another article in the same book (pp. 46-85), Dr. Bose reported the isolation of a new plant metabolite, named ‘karabin’, $C_{21}H_{49}O_8$ from the ethereal extract of the roots of *Nerium odorum* (‘Karabi’ in Bengali) (*Journal of the Chemical Society*, 1901). Since the search was for its poisonous principle, Dr. Bose also studied the physiological actions of karabin^{6,7}.

Dr. Bose’s article on the finding of Paka oil as an adulterant in Mustard oil in the Medico-legal section was of importance during that period when food adulteration was rampant in the markets⁸.

Dr. Bose as a Science Communicator

In the present article, more emphasis is being given to the activities of Dr. Bose as a science communicator. Dr. Bose strongly believed that education and awareness are the key elements to create reforms. In order to imbibe scientific temper in his fellow countrymen, he delivered many lectures and wrote a good number of articles in both Bengali and English on a variety of topics directly related to the wellbeing of the public. Some of the more relevant topics are: benefits of maintaining hygiene and sanitation in rural Bengal, importance of balanced diet and regular exercise especially in managing type 2 diabetes, adulteration of food and environmental pollution (toxicity of white/pink Oleander, i.e. *Nerium odorum* and poisoning by arsenic, lead, cyanide and formalin), infant and maternal mortality, etc.

Lectures Delivered: Dr. Bose delivered many lectures at various organisations during his lifetime. The list is, as one may expect, too long to be reproduced here. Perhaps special mention should be made of lectures on popular science topics like Water, Air and Food that he delivered in the Sahitya Sabha (established in 1899 in Sobhabazar Rajbari) and Bangiya Sahitya Parishad. These lectures were later published in the 2-volume-book^{2,3}. Pertinently, Dr. Bose was elected the President of the Sahitya Sabha in 1910.

Some of the other lectures that he delivered were at the 14th All India Temperance Conference, Calcutta (1917; Presidential Address on ‘Temperance Movement in India’), Science Conventions (1st, Calcutta, 1917; on ‘Some practical hints to improve the dietary of the Bengalis’; 2nd, 1919; ‘On the Science Association and its Founder’ and on ‘Some Common Food-stuffs’), 7th Indian Science Congress, Nagpur (1920; on ‘Choice of Food’), 2nd Industrial and Social Exhibition, Dacca (1920; on ‘Food’), Health and Child-Welfare Exhibition, Town Hall, Calcutta (1920; on ‘Impure Air and Infant Mortality’), IACS (1920; on ‘The history and chemistry of paper making’ and ‘The history and chemistry of matches’; reproduced in the ‘Industrial Chemistry’ section of the first volume of J.P. Bose’s book), 13th Bengal Literary Conf., Science Section, Midnapur (1922; Presidential Address), and many more.

Bengali Books: Two of his Chemistry textbooks in Bengali are ‘Falita Rasayana’ (1895) and ‘Rasayana-Sutra’

(Vols. I, II: 1897, 1898) (meant for vernacular medical schools in Bengal). Some of his Bengali books on general science for the public are: 'Jal', 'Vayu', 'Kagaj', 'Alok', 'Khadya', 'Sarir Swasthya-Vidhan' (1913; based on his articles published in 'Bharati' and dealing with ways and means to prevent infectious diseases), 'Palli-Swasthya' (1916; based on his lectures on Village Sanitation given at Rammohun Library and on Malaria given at Sahitya Sabha; both the lectures were delivered at the behest of Acharya J.C. Bose), Cha, Puri Jaibar Pathe, Pallibasir Prati Nibedan, etc.

English Books: Some of his popular science books in English are: 'A Lump of Coal', 'Combustion', 'A Pinch of Common Salt', 'The Tip of a Match' (these 3 books were based on his lectures delivered at the Calcutta University Institute), 'The Health of Indian Students', 'Milk Supply of Calcutta: Its Hygienic, Social and Commercial Aspects', 'Prevention of Small Pox', 'A Few Hints on Sanitary Reconstruction', etc. Dr. Bose also wrote biographies on Sir Gooroodas Banerjee, the 1st Indian Vice-Chancellor of the Calcutta University.

Crusade against Narcotics: The three most important curses to humanity are alcohol, opium and cocaine. But in the first decade of the 20th century, cocaine became the biggest menace in Bengal. As per the Annual Report of the Chemical Examiner's Department, Bengal Govt. for the period 1908-1911, cocaine-mania sharply increased (no. of cocaine samples analysed in 1908: 125, 1909: 243, 1910: 621, 1911: 2138), which led to alarming increase in crime rates in Bengal. This state of affairs motivated Dr. Bose to work scientifically on the abuse of cocaine. He was a crusader against the widespread use of narcotics in both urban and rural India. His seminal paper on cocaine titled 'Cocaine poisoning', published in the *British Medical Journal* in 1913, brought to fore his own experience of the death or illness of six patients from cocaine-poisoning⁹. He dealt with this issue elaborately in an article titled 'Cocaine Poisoning', published in the first volume of J.P. Bose's book^{10a}.

1st Indian Poison Act, Genesis: While a Vice-President of the Medico-legal Section of the first Indian Medical Congress held in Calcutta in December, 1894, Dr. Bose presented in this Section a paper (co-author: late Captain J.F. Evans, Professor of Pathology, CMC) titled 'The Necessity for an Act to restrict the Free Sale of Poisons in Bengal', which eventually led to the passing of the 'Indian Poison Act' of 1904. However, it was later revoked and a new Poison Act came into being in 1919.

History of Research in Chemistry in Bengal: Though not a historian of science, Dr. Bose wrote an article titled 'A Brief Survey of Research-work in Chemistry in Bengal'^{10b}. He stated that research in chemistry started in Bengal in the CMC. Beginning with the contribution of Dr. William Brooke O'Shaughnessy's (teacher in Chemistry and Pharmacology in the CMC) 'Bengal Pharmacopoeia' (1844), Dr. Bose touched upon the successive contributions of Dr. Rai Bahadur Kanny Lall Dey, C.I.E. (studies on indigenous medicinal plants and discovery of an important test for porphyroxyn in Indian opium in 1867), Edward John Waring ('Indian Pharmacopoeia', 1868), Kanny Lall Dey and Moodeen Sheriff (Indian Surgeon and practitioner of herbal medicine) (pharmacology), Wood (efficient isolation of quinine from Cinchona bark), William Dymock, C.J.H. Warden and David Hooper ('Pharmacographia indica', 3 volumes, 1890-1893), Ram Chandra Datta (isolation of kurchicine from the bark of Kurchi, i.e. *Holarrhena antidysenterica*), etc.

He also discussed his own work on karabin, Sir David Prain's (Director, The Royal Botanic Garden, Calcutta in 1898) work on 'Ganja'- the flowering tops of *Cannabis sativa*, Sir Alexander Pedler and Dr. Warden's isolation of a neutral constituent from Bengal opium, Warden and Waddell's isolation of a proteid substance, Abrin (a mixture), responsible for the poisonous property (to kill cattle by injection), from the seeds of *Abrus precatorius* and many more.

He went on discussing the work of Acharya P.C. Ray, especially on the conjugated sulfates of the copper magnesium group, on nitrites, etc., Dr. Nilratan Dhar's research and research supervision, research in Science College, Calcutta (with special reference to Dr. J.C. Ghosh's discovery of a Law), Dr. R.L. Dutt's achievement in Industrial Chemistry (no less than 20 patents), and increasing pursuit of research in the IACS.

He also touched upon the research work carried out in other provinces and referred to the emergence of various industries on drugs and chemicals, soap, leather, glass, etc. in Bengal and other provinces in India. He made special mention of the Bengal Chemical and Pharmaceutical Works Ltd. and the Calcutta Chemical Works Ltd. in this regard.

Teaching and Allied Activities

Dr. Bose was a popular Teacher. In addition to teaching at the CMC, he used to teach Chemistry and Physics in the Campbell Medical School (now known as N.R.S. Medical College) in 1896. He was closely associated

with Dr. Mahendra Lal Sircar and the IACS where he started taking classes in Commercial Analysis, including the analysis of food, water, drugs, ores and other commodities in 1898. In 1899, he started teaching Chemistry at the IACS. He also taught in Carmichael Medical College (now known as R.G. Kar Medical College). Dr. Bose became a Member of the Board of Studies in Medicine, Chemistry, Physiology, Zoology and Botany, an Examiner in Arts, Science and Medicine and a Member of the Council of Postgraduate Teaching in Science of the Calcutta University.

Service Record and Appreciation

After serving the Bengal Government for three decades and a half, Dr. Bose retired on the 12th September, 1920 (which includes six months' privilege leave w.e.f. the 13th March, 1920, preparatory to retirement). On March 18, 1920 the College Council of the CMC met and made the following remark about Dr. Bose: *"During all these years, this officer (Dr. Bose) has been untiring in his devotion to everything pertaining to the highest interests of the College, and the welfare of the students^{10c}."* This comment bears testimony to Dr. Bose's sincerity to service and love for students.

In the Annual Report of the Chemical Examiner's Department of the CMC for 1919 (the last year that included review of Dr. Bose's work), they tagged him as *"...one of the ablest and most popular officers serving under the Medical Department, a highly scientific chemist, a popular teacher and a man of many talents blessed with a spirit of intense application. No officer could have rendered Government more faithful and loyal service^{10d}."* On the day of his retirement, the staff-members of the Chemical Examiner's Department, CMC presented him with a silver tea cup with a suitable inscription expressing their love and esteem for him. The College Council of the CMC placed a portrait of Dr. Bose in the Professors' Room. All these point to the virtues of Dr. Bose.

Honours Received

Throughout his life Dr. Bose was associated with many educational, social and philanthropic and commercial organisations. Expectedly, he earned many accolades in his life, some of which are as follows. He became a Fellow of the Chemical Society of London (1894), a Fellow of the Calcutta University (1898), a recipient of the Coates' Memorial Prize of the Calcutta University for his Thesis titled 'The Chemistry and Toxicology of Nerium Odorum' submitted to the C.U. in 1901, and 'A Companion of the Imperial Service Order' (1915).

In 1921, Dr. Bose assumed the office of the Sheriff of Calcutta at the time of visit of the Duke of Connaught to India. He was the second person from the medical profession to hold this office, the first person being Dr. Mahendra Lal Sircar, M.D.

In 1922, Dr. Bose was made 'A Companion of the Order of the Indian Empire'. This award was commented in the Review of vol. I of J.P. Bose's book as follows: *"His (Dr. Bose's) great abilities, his erudition and his exceptional keenness were rewarded by Government with the bestowal of different decorations, culminating in the well earned award of the C.I.E.⁴ⁿ."*

Association with three Industries in Bengal



Sitting (from L): W.M. Roy, Sir P.C. Ray, Chunilal Bose, Kunja Behari Basu; Standing (from L): Haridhan Dutt, Satyananda Bose, Rajsekhar Bose (Founder Members & Board of Directors, BCPL)

Dr. Bose was a Member of the Advisory Board of Industries, Bengal. But his association with three important industries in Bengal deserves a special mention. Besides being the Director of both the Calcutta Chemical Co. Ltd. and the Calcutta Soap Works Ltd., he was the Founder Member and Chairman, Board of Directors of the Bengal Chemical and Pharmaceutical Works Ltd. (1899).

Honourable Positions held

Dr. Bose was the President/Vice-President/Trustee/Member of the Board of Studies/ Member of the Governing Body/Chairman of the Board of Directors/Secretary, etc. of many institutions like the Calcutta University, Bethune College, Bethune Collegiate School and Sanskrit Collegiate School, All India Temperance Conference, Bengal Literary Conf., Calcutta Chemical Co. Ltd., Calcutta Soap Works

Ltd., Central Textbook Committee, Bengal, Indigenous Drugs Committee, Bangiya Sahitya Parishad, Sanitary Board, Bengal, Bengal Social Service League, District Charitable Society of Calcutta, Calcutta Orphanage and Calcutta Blind School, and many more.

In 1917, Dr. Chunilal Bose became the President of Acharya Jagadis Chandra Bose Parishad. He was also the Editor of *The Calcutta Journal of Medicine* for 3 years. Dr. Bose was actively associated with the Mohunbagan Athletic Club since its inception in 1889.

Epilogue

A fitting appreciation of Dr. Chunilal Bose's contribution came from the following comments made in *Indian Journal of Medicine* in its June, 1922 issue on his receiving the honorific title C.I.E.: "*In him are combined the qualities of level-headedness, honesty of purpose, congenial manners and a courage of conviction which are exhibited in the highest degree and have characterized the man everywhere, ... He is an author of many books on Chemistry and Hygiene and has devoted his whole life to popularizing science for the benefit of his countrymen*^{10e}."

Dr. Bose spent the last days of his life at Ranchi. He breathed his last on the 3rd August, 1930. The community

of science communicators especially in Bengal suffered a great loss at the demise of this scientist-cum-science communicator. □

References

1. Indranil Sanyal, 'Dr. Chunilal Bose: a forgotten scientist and a science communicator', *Indian J. Hist. Sci.*, 57, 151-169 (2022); <https://link.springer.com/article/10.1007/s43539-022-00038-0>
2. 'The Scientific and other Papers of Rai Chunilal Bose Bahadur', J.P. Bose, Ed., Vol. I, Calcutta, 1924; <https://doi.org/10.11588/xarep.00002782>
3. *Ibid*, idem, Vol. II, Calcutta, 1925; <https://doi.org/10.11588/xarep.00002782>
4. Review in *Indian Medical Gazette*, 59 (10), 523 (1924).
5. Review in *Indian Medical Gazette*, 61 (2), 99-100 (1926).
6. C. Bose, 'On the chemistry and toxicology of Nerium odorum with a description of a newly separated principle', *Indian Medical Gazette*, 36 (8), 287-290 (1901).
7. Idem, *ibid*, 36 (11), 408-412 (1901).
8. C. Bose and S.N. Sen, 'Paka oil in mustard oil as an adulterant', *Indian Medical Gazette*, 54 (11), 413-416 (1919).
9. C. Bose, 'Cocaine Poisoning', *British Medical Journal*, Jan. 4, 1913, p. 16; <https://doi.org/10.1136/bmj.1.2714.16>
10. Ref. 2: (a) pp. 369-378, (b) pp. 104-112, (c) pp. xv-xvi, (d) pp. xvii, (e) pp. xxiii-xxiv.