

THE VIOLIN AND THE GENESIS OF THE BOSE INSTITUTE IN CALCUTTA

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Violin, the string and bow musical instrument invented in India and perfected in Italy has some strange linkages with the creations of the Bose Institute (*Mātrimandir Punyo Angon*), the world's first interdisciplinary research Institute in Calcutta on 30th November 1917. Directly inspired by great Bengali Indian philosopher Narendranath Datta (known as Swami Vivekananda), American Woman Pioneer Mrs. Sara Chapman Bull, wife of the legendary Norwegian violinist Ole Bornemann Bull committed US \$20,000 to Professor Jagadis Chunder Bose on 2nd January 1902 for his inter-disciplinary research laboratory in Calcutta. This happened when the hostile local British colonial authorities of the education department refused to honour the strong recommendation made by a galaxy of prominent members of the British Royal Society headed by Lord Kelvin for a research laboratory for Professor Bose at the Presidency College, Calcutta. This money, equivalent in amount to that of the 1902 Nobel Prize, was delivered to Professor Bose in four installments during 1906 through 1909 and was used to buy the land (*Punyo Angon*). Therefore, January 2, 1902 is the actual formal date of conception of the Bose Institute in Calcutta, India.

Requests for additional funds led to a written commitment of US \$ 20,000 from Mrs Bull on 14th July 1910. This additional money equivalent in amount to that of the 1910 Nobel Prize was delivered to Professor Bose during 1914-1915 by her brother Mr. Joseph Gilbert Thorpe Jr., and created the main building of the Bose Institute (*Mātrimandir*). The major objective of this research paper is to analyze the original facts surrounding this resurrection and triumph of science research in modern India in the first quarter of the twentieth century.

Key words: Bose Institute, Ole Bull, Resurrection of Science Research in India, Sara Chapman Bull, Swami Vivekananda, Stradivari Violin.

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1. INTRODUCTION

Spontaneous resurrection of research works in physical sciences in India by Professor Jagadis Chunder Bose created the necessity of a research laboratory for him at the Presidency College, Calcutta. Professor Bose formally began path breaking experimental research with wireless waves in November 1894 and published several important papers in rapid succession in the *Proceedings of the Royal Society, Great Britain* with patronage from his Professor Lord Rayleigh (Geddes, 1920). Highly impressed by his pioneering experimental research works performed at the Presidency College and their skillful demonstrations in Great Britain in the second half of 1896, a galaxy of renowned members of the Royal Society, recommended that a well-equipped research laboratory be built and provided for Professor Bose's experimental researches at the Presidency college. Spearheading this effort, Lord Kelvin (President of the Royal Society, 1890-1895) sent a strong letter to the then Secretary of State for India, Lord George Hamilton on 23rd October 1896 (Fig. 1). This recommendation letter with a follow-up memorandum signed by a large number of very distinguished members of the British Royal Society, travelling downwards fell flat on the then Director of Public Instruction and the Principal of the Presidency College, both very hostile to Professor Bose's research works.

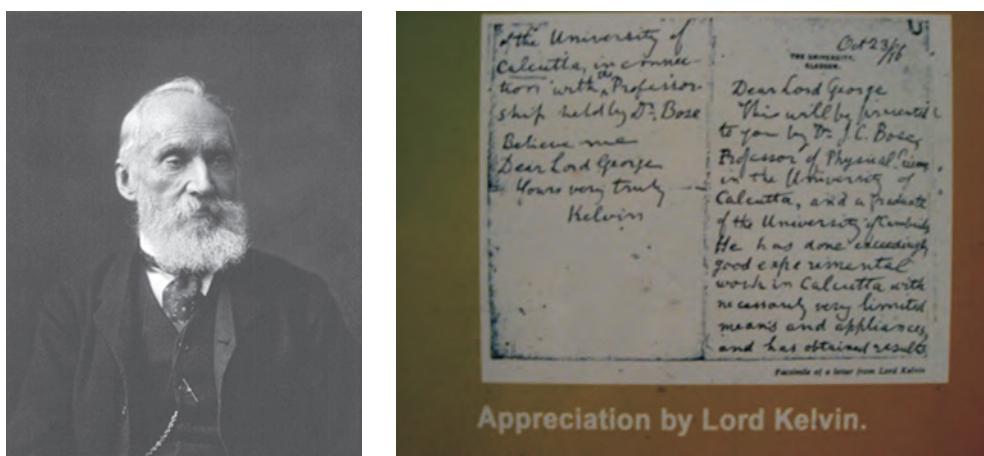


Fig. 1. Lord Kelvin and excerpts from a copy of his letter to Lord George, Secretary of State for India (1895-1903) recommending on 23rd October 1896, establishment of a research laboratory for Professor J. C. Bose at the Presidency College, Calcutta, India.

The finance department of the British colonial government in India where Edward Norman Baker, an Indian Civil Service (ICS) officer was then the Financial Secretary and who later went on to become Lieutenant



Fig. 2. Professor Jagadis Chunder Bose (1858-1937) and Mrs. Abala Bose.

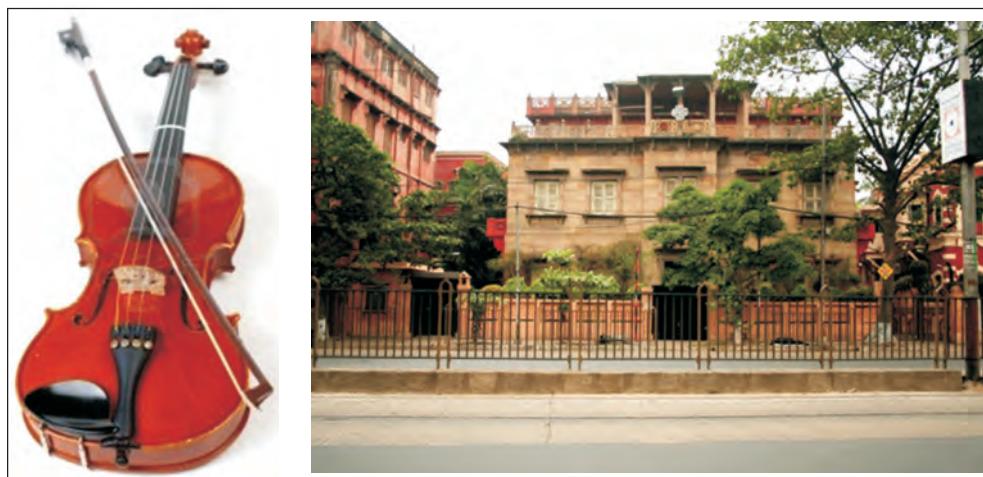


Fig. 3. The Violin and the Bose Institute bridging physical and life sciences.

Governor of Bengal (1908-1911), did not approve the funds for the research laboratory at the Presidency College, recommended by the distinguished members of the British Royal Society. These events remain eloquently summarized in the following words of Patrick Geddes (1920) (Fig. 4):

68 LIFE AND WORK OF SIR JAGADIS C. BOSE

Among the memorialists were Lord Lister, then President of the Royal Society, Lord Kelvin, Professor Clifton, Professor Fitzgerald, Dr. Gladstone, Professor Poynting, Sir William Ramsay, Sir Gabriel Stokes, Professor Silvanus Thompson, Sir William Rücker, and others.

Impressed by all this, the Secretary of State sent a dispatch (May 1897) to the Government of India enclosing the memorial, and supporting it—‘being of opinion that the question of establishing an institution of the kind mentioned is deserving of consideration by Your Excellency in Council.’

Lord Elgin, then Viceroy, told Bose that the Government was interested in his project, and would communicate with the Government of Bengal. This came filtering through departmental channels, with the appended note that though the scheme was important, yet it might be postponed to a future date. Bose understood what this really meant. He had succeeded in making the India Office and the Government recognise the claims of science ; but he also realised that the Government working machinery could be effectively delayed by departmental cogwheels.

Fig. 4. Biographer Patrick Geddes' description (1920) of the follow on events surrounding the research laboratory proposal for Professor J. C. Bose (1858-1937).

Professor Bose was very deeply disappointed by the then Government's apathy and his state of mind remains poignantly captured in his own words in the letter of 20th July 1901 (Fig. 5) written to Poet Rabindranath Tagore (Sen, 1994):

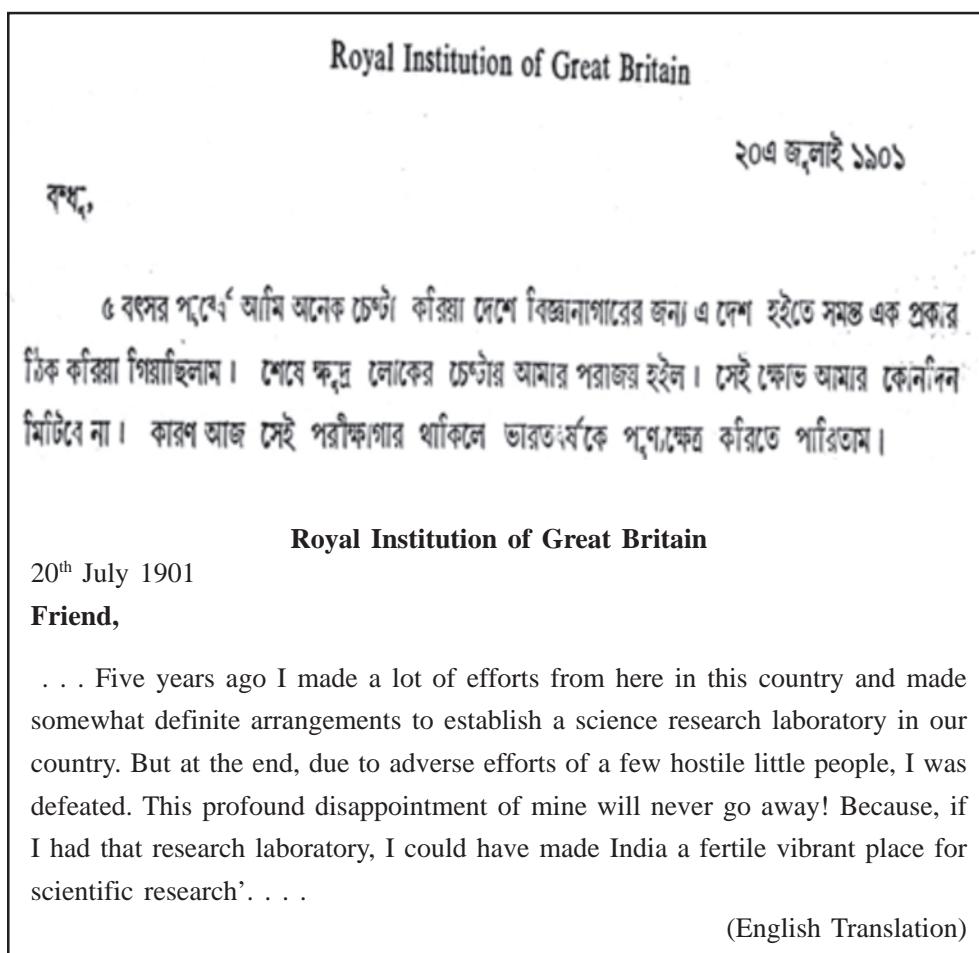


Fig. 5. Excerpts from Professor J. C. Bose's letter (20th July 1901) to poet Rabindranath Tagore in Bengali language (original, with English translation) expressing profound disappointment for not having the research laboratory.

It is at this critical juncture that the ‘Holy Trinity’ assembled by the violin sprang into action to help the cause of scientist pioneer Professor J. C. Bose.

2. THE VIOLIN ASSEMBLES THE ‘HOLY TRINITY’

Upon his return from professional tour of Europe in April 1897, Professor Bose engaged in further researches on novel detectors for wireless

waves. This effort at the Presidency College led to the revolutionary invention of contact diode detectors of wireless waves. One version of this device, the iron-mercury-iron self-recovering coherer with a telephone (Bose, 1999) was used by Guglielmo Marconi to successfully receive the first Transatlantic wireless signal on 12th December 1901 (Bondyopadhyay, 1998, pp. 259-285). Another version, the galena crystal detector was patented by Professor Bose in Great Britain (Bose, 1902) and the United States (Bose, 1904) and this established him as the world's first pioneer inventor of infrared detectors (Bondyopadhyay & Banerjee, 2008).

2.1. Violin's ancestor – a single string and bow musical instrument, was invented by King Ravana of Sri Lanka and is known as *Ravanastron* in Europe. Lord Hanuman, a trusted lieutenant of Lord Rama set fire to Ravana's kingdom and destroyed it to rescue Sita Devi (Chakravarti, 1951) (whom Ravana had kidnapped at the instigation of his sister Sūrpanakhā) and brought the instrument to India. The multi-string and bow musical instrument was created in India. Over the years, it travelled to Constantinople, capital of the Eastern Roman Empire in the middle ages, via Bagdad through Arab traders and finally reached Italy in the 16th century. Antonio Stradivari (1644-1737) of Cremona, Northern Italy made major innovative improvements to this marvelous instrument and the three sisters, viola, cello (the big sister) and violin (the little sister) were born. The instruments soon conquered the hearts and minds of the music world in Europe and from there, the rest of the world. Norway's romantic legendary violin maestro Ole Bornemann Bull had traced this origin in his hand-written Notes published in his biography of 1883 (Bull, 1883, pp.348-351).

2.2. The American woman pioneer of Norwegian descent, Sara Chapman Thorpe was born on May 24, 1850 in Oxford, Upstate New York and grew up in Wisconsin (Fig. 6). Her father, Joseph Gilbert Thorpe owned vast forests in the state of Wisconsin and made a fortune as a successful timber merchant. He was a state senator, and a socially prominent person of the time regularly promoting cultural and social events in the area. Influenced by her mother, Sara developed a strong independent scholarly mind. While Sara was growing up, violinist Ole Bull visited the United States on solo concert tours across the United States many times and stayed in the Thorpe mansion while performing in Wisconsin. Acquaintance with the Thorpe family soon led to young Sara's marriage with the violinist, a widower, with her mother's approval despite a large age difference. The violinist died in 1880



Fig. 6. Mrs. Sara Chapman Bull (b. May 24, 1850, d. January 18, 1911), the woman pioneer of the United States of America and her husband, legendary Norwegian violinist Ole Bornemann Bull (b. February 5, 1810, d. August 17, 1880).

and very soon Sara, the young widow, embarked on writing a biography of her beloved husband which was published (Bull, 1883, pp.348-351) in 1883.

2.3. In a separate development, great Bengali Indian philosopher Narendranath Datta (b. 12 Jan 1863, d. 4 July 1902), widely known as *Swami Vivekanand Ji*, left Calcutta on 31st May 1893 for the United States via Japan (the Pacific route) to attend world Parliament of Religions being held in Chicago to commemorate the 400th anniversary of Christopher Columbus's 'discovery' of America. He delivered an excellent mesmerizing speech on 11th September 1893 and created a stir. He stayed on and travelled in the United States lecturing on Indian Vedanta philosophy and teachings of the Hindu religion (Vivekananda, 1977). While visiting and lecturing in New York and at Harvard University in Cambridge, Massachusetts, he met Mrs. Sara Chapman Bull for the first time in the summer of 1894. Swami Ji stayed in her house as a guest three times during the first lecture tour of the United States. Sara had already built a fascination and admiration for India, the birth place of her late beloved husband's musical instrument, the violin.

2.4 Swami Ji travelled to Great Britain in November 1895 and delivered several lectures. While there, he met Miss Margaret Elizabeth Noble (b. 28 Oct. 1867, d. 13 Oct. 1911), a young school teacher from Wimbledon, England

who became interested in the Indian Vedanta philosophy and women's education in India. Swami Ji went back to the United States and from there returned to India via Europe arriving in Calcutta on 19th February 1897.

In the mean time, the scientist Professor J. C. Bose began his pioneering experimental research with wireless waves at the Presidency College in 1894 and in July 1896 travelled to England on a professional visit to demonstrate his achievements in wireless research. He received a D.Sc. degree from the University of London based on his research performed at the Presidency College and publications in the Proceedings of the Royal Society, London. He returned to Calcutta in April 1897.

2.5 At the invitation of Swami Ji, Miss Margaret Elizabeth Noble arrived in Calcutta in January 1898 to visit India. Also from the United States of America, with Swami ji's invitation, Mrs. Sara Chapman Bull arrived in Calcutta, via Bombay on 14th February 1898 (Fig. 7). On 30th March 1898, Both Miss Noble and Mrs. Bull visited Professor Bose's wireless research



Fig. 7. From the left, Mrs. Sara Chapman Bull, the 'dearest mother'; Great Bengali Indian philosopher Narendranath Datta (Swami Vivekanand Ji), the 'son'; and Miss Margaret Elizabeth Noble, the 'great spirit' ('Holy Trinity') visiting Kashmir India, September 20, 1898. The trio helped Professor J. C. Bose establish the Bose Institute, the world's first inter-disciplinary research Institute, building bridges between experimental physics and biology.

laboratory at the Presidency College and was impressed by his pioneering work being done there including the demonstration of the ‘Electric Eye’ – the diode detector of wireless waves that Prof. Bose had just invented. This first rendezvous will soon turn out to be a momentous event in the history of science research in India.

3. PROFESSOR JAGADIS CHUNDER BOSE - WORLD PIONEER OF INTER-DISCIPLINARY RESEARCH

Throughout his entire professional research career Professor Jagadis Bose was an experimental physicist par excellence. Professor Bose himself created and devised locally, various highly sensitive instruments to probe the mysteries of nature involving non-living and living objects. While working on innovative self-recovering detector devices for wireless waves during 1897 and 1898 (Bose 1899), he logically and seamlessly moved into investigating wireless signal responses of biological and botanical objects.

3.1 To welcome the twentieth Century, an international industrial exhibition (The Exposition Universelle of 1900) was being held in Paris, France from 15th April 1900, through 12th November 1900. This Exhibition held the International science congress to report on the frontiers of science research. Professor Bose obtained permission from the Governor of Bengal to attend and present his inter-disciplinary research work at the Congress (Geddes, 1920, Bose, 1900, 1902) and accordingly set sail for Europe in the middle of June 1900.

3.2 In a separate simultaneous development, the central figure, Bengali Indian philosopher Narendranath Datta (Swami Vivekanand Ji) began his second voyage to the West on 20th June 1899 from Calcutta. Accompanying him in the voyage was Miss Margaret E. Noble. After visiting the United States, Swami ji arrived in France on 3rd August 1900 on his way back to India. He stayed in Paris for two and a half months visiting the Paris Exhibition. Also in Paris was Mrs. Sara Chapman Bull attending the exhibition and Miss Margaret Noble was also there. This second rendezvous of the ‘Holy Trinity’ had a decisive constructive role in the resurrection and advancement of science research in India. The trio attended the scientific research presentation of Professor Jagadis Bose at the Congress. A vivid description of Professor Bose’s presentation with the trio in attendance, remains poignantly and

eloquently captured in a contemporary publication (Bondyopadhyay & Banerjee, 2008, Vivekananda, 1977, pp. 379-380). This second rendezvous between Professor Bose the scientist and the ‘Holy Trinity’ was a watershed in the history of resurrection of inter-disciplinary research in India as it quickly led to Mrs. Bull’s financial sponsorship of his research activities including publications of his research.

4. MRS. SARA CHAPMAN BULL’S HISTORIC COMMITMENT

During her year-long first visit to India in 1898 at the invitation of the great Bengali Indian philosopher Narendranath Datta, Mrs. Sara Chapman Bull learnt directly from Professor Jagadis Chunder Bose, the scientist, that very distinguished members of the British Royal Society had recommended for the establishment of a research laboratory for Professor Bose at the Presidency College, Calcutta, India. The memorandum sent to the then Viceroy of India, Lord Elgin, included the names of three Presidents of the Royal Society: Lord Lister (1895-1900), Lord Kelvin (1890-1895) and Sir George Gabriel Stokes (1885-1890), the Lucasian Chair Professor of mathematics at Cambridge University. This knowledge, together with her first hand observation of experimental demonstration of the new contact diode detector of wireless waves invented by Professor Bose at his small self-made laboratory at the College and above all her fascination and love for the birthplace of violin convinced her to make the historic commitment described below.

Mrs. Bull, then, 51 years of age, drew up her new hand-written Will in London, England bequeathing US \$20,000 to Professor Jagadis Chunder Bose. The Will was formally signed on 2nd January 1902, just 23 days after the first Nobel Prize, derived from Alfred B. Nobel’s Will, was awarded to Wilhelm Conrad Roentgen in Physics for his discovery of the X-Ray in 1895. This singular act of generosity and farsightedness towards resurrection of inter-disciplinary science research in India by this great pioneering widow from a far-away country has no parallel in the history of science and technology. The relevant portion of this Will is reproduced from the original in Fig. 8. In making this historic gift to resurrect basic science research in India through self-propelled initiatives of Professor Bose, and implementing the wishes of the British Royal Society Mrs. Bull wrote in her own handwriting on 2nd January 1902 (Fig. 8):

'I give and bequeath to my friend, Jagadis Chunder Bose, now resident in Calcutta, India, the sum of twenty thousand dollars with interest at six percent from the time of my decease until payment in full by my executors

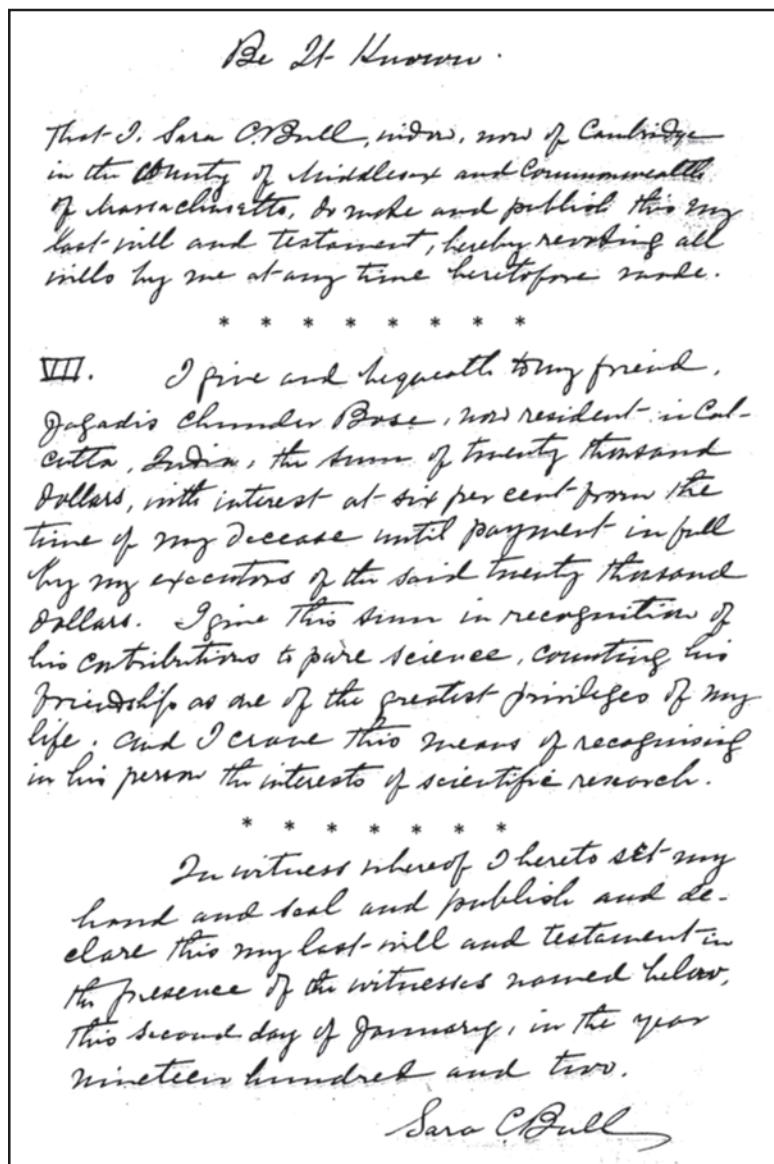


Fig. 8. Excerpts from the Will of Mrs. Sara Chapman Bull, January 2, 1902 bequeathing US \$20,000 to Professor J. C. Bose for his inter-disciplinary science research laboratory.

of the said twenty thousand dollars. I give this sum in recognition of his contributions to pure science, counting his friendship as one of the greatest privileges of my life; and I crave this means of recognising in his person the interests of scientific research.'

5. DELIVERY AND ACKNOWLEDGEMENT OF THE GIFT

During the professional tour of Europe which began in June 1900 and ended in October 1902, Professor Bose faced three major difficulties in quick succession. Early on, he fell seriously ill during a lecture-demonstration in Great Britain. Mrs. Bull rushed in from the continent to take care of his medical needs and Professor Bose recovered soon after. His research work at the Royal Institution was facing interruptions because he was not able to secure paid leave of absence from the Presidency college in Calcutta, India. Also, his choice of objects under experimental investigation, moved from being 'non-living' to 'living', thus crossing the rigid boundary between physical sciences and life sciences existing at that time. He faced severe opposition in getting his pioneering research works published in existing journals.

It was promptly decided that Professor Bose's inter-disciplinary research work will be published as research books and Mrs. Bull will finance the publications. Miss Margaret Noble promptly went into action to prepare the manuscript with typing and editorial assistance and the first research book (Bose 1902) was published by Longmans and Green of London, in September 1902. Having taken timely care of the three issues, facing Professor Bose and immediately after signing her will on 2nd January 1902 (Figure 8) Mrs. Bull left London for India on 4th January 1902 with Miss Noble, arriving in Calcutta in the first week of February 1902 and met Swami Ji. It can be logically concluded that Swami Ji learnt firsthand in general terms that Mrs. Bull had extended her full support towards Professor Bose's needs in his research work. Professor Bose remained in London with his research, at the Royal Institution and returned to India in October 1902.

During 1903-1906, energized and emboldened by Mrs. Bull's financial support and patronage, Professor Bose completed his path-breaking experimental inter-disciplinary research on *Plant Response as a means of Physiological Investigation* and published the results in the form of a massive

book. As promised earlier, Mrs. Bull financed publication of the book and Margaret Elizabeth Noble provided expert editorial assistance on the manuscript. In his personal hand-written correspondence, after 1904, Professor Bose addressed Mrs. Bull as ‘Dearest Mother’ or ‘My darling Mother’ and regularly signed off the letters as ‘Your own son’. This 1906 book (Bose, 1906) was dedicated to Mrs. Bull (Fig.9) by Professor Bose with the word

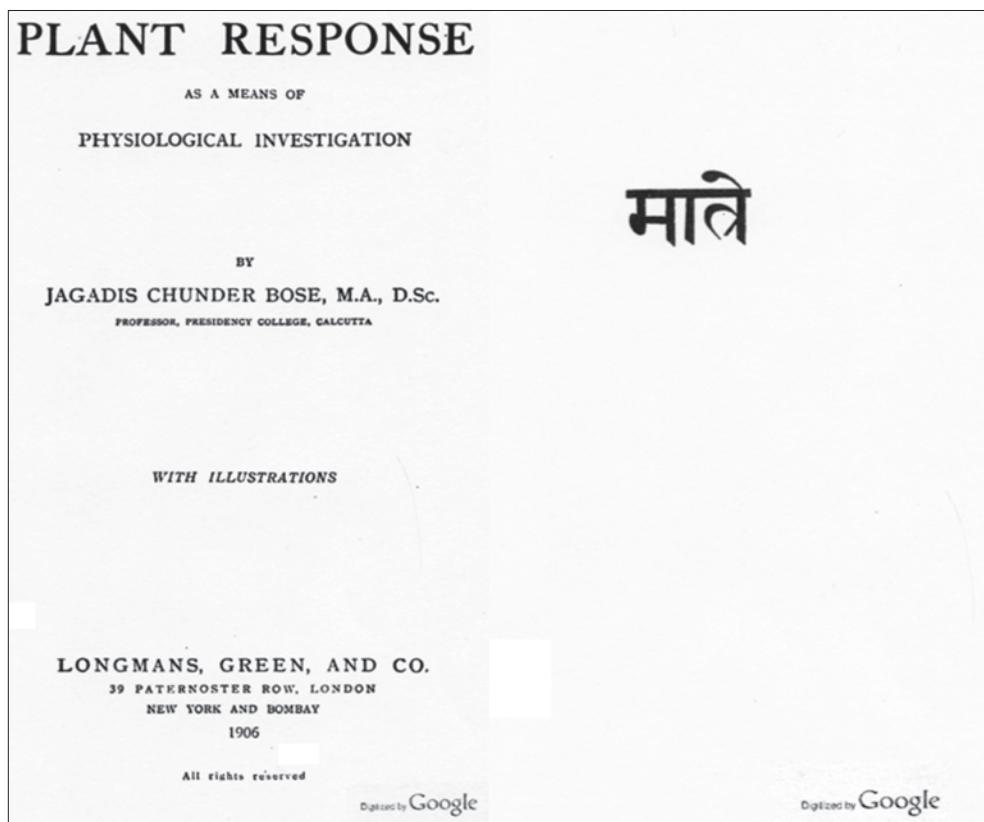


Fig. 9. Professor Bose’s second book publishing his inter-disciplinary research work performed at the Presidency College, Calcutta during 1903-1906 along with the dedication.

‘Matre’ (written in Sanskrit) which also meant the motherland India. Recalling this with gratitude, Professor Bose in an emotionally charged letter explained the meaning of the word ‘Matre’ to her on 1st March 1906. This letter is transcribed below and reproduced in full in Fig. 10.

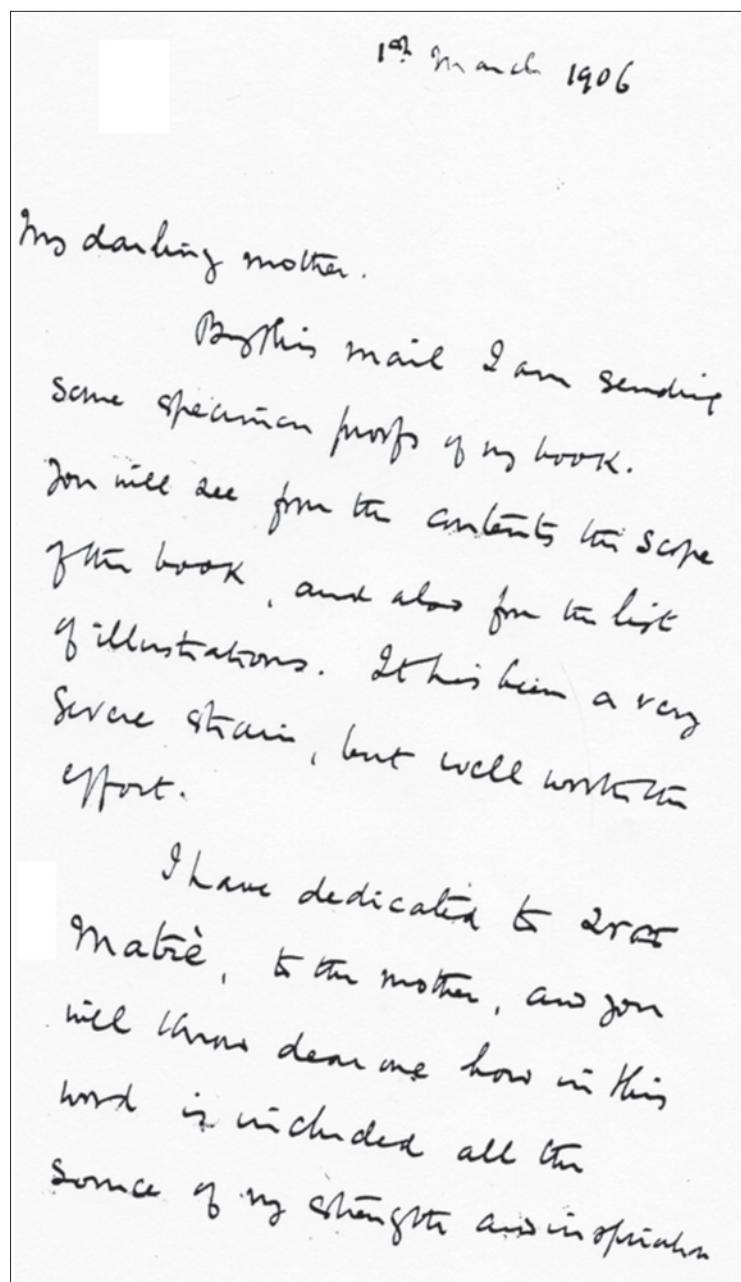


Fig. 10. Professor J. C. Bose's hand-written letter (page 1) of 1st March 1906 to Mrs. Sara Chapman Bull sending some specimen proofs of his 1906 research book (Bose, 1906) and explaining the meaning of the book's dedication word, 'Matre'.

The mother whose love made me
realise what love was, what
protection was. Then the motherland
which now is almost broken down,
but her sons will one day make
her beloved of the world again.
The mother-love that has been mine
since the time I was near death's
door. How wonderful is the revelation
which love brings, and how
we realise in this life, the love
divine.

Do you know how in the
Cottage at Dargis the first
Sketch of what was to be in
book was written; how at the
end of the long tramp the

Fig. 10. Professor J. C. Bose's hand-written letter (page 2) of 1st March 1906 to Mrs. Sara Chapman Bull sending some specimen proofs of his 1906 research book (Bose, 1906) and explaining the meaning of the book's dedication word, 'Matre'.

was the bright fire and brought welcome
news. Do you know how when I
was little, ~~how~~ I used to bring in
a shameful way some trifles
for my mother. And now I bring
this book for you.

And remember you are the
~~the~~ always wise, always noble
always perfect. For just as in
imperfection I am capable of making
an earthly love which brings
greater service, so one who is
so dear to me is to transcend
my love

Yours ever son.

Fig. 10. Professor J. C. Bose's hand-written letter (page 3) of 1st March 1906 to Mrs. Sara Chapman Bull sending some specimen proofs of his 1906 research book and explaining the meaning of the book's dedication word, 'Matre'.

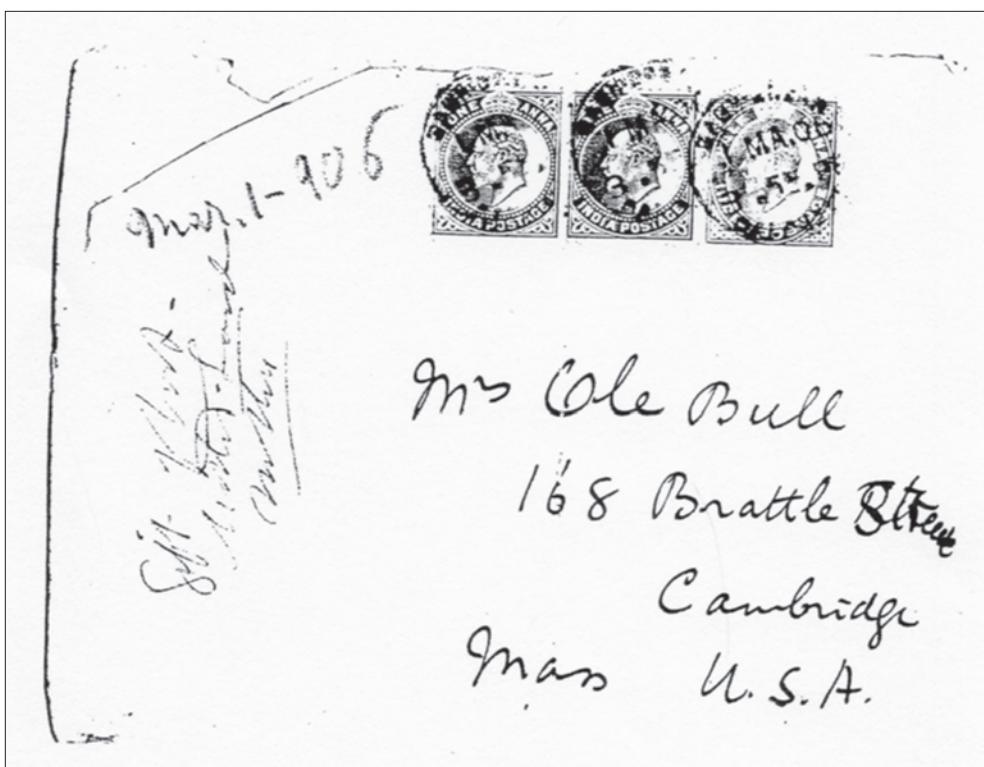


Fig. 10. Envelope cover of Professor J. C. Bose's hand-written letter of 1st March 1906 to Mrs. Sara Chapman Bull sending some specimen proofs of his 1906 research book (Bose, 1906) and explaining the meaning of the book's dedication word, 'Matre'.

1st March 1906

My darling mother,

By this mail I am sending some specimen proofs of my book. You will see from the contents the scope of the book, and also from the list of illustrations. It has been a very severe strain, but well worth the effort.

I have dedicated to '**Matre**', to the mother, and you will know dear one how in this word is included all the source of my strength and inspiration. The mother whose love made me realize what love was, what protection was; then the motherland which now is almost broken down, but her sons will one day make her beloved of the world and then the mother-love that has been mine since the time I was near death's door. How wonderful is the revelation which sorrow brings, and how we realize in this life, the love divine.

Do you know how in the cottage at Darjiling the first sketch of what was to be the book was written: how at the end of the long tramp there was the bright fire and brighter welcome ready. Do you know how when I was little, I used to bring in a shame faced way some trifle for my mother. And now I bring this book for you.

And remember you are to be always wise, always noble always perfect. For just as in proportion I am capable of greater and greater love which brings greater service, so are who is so dear to me is to transcend my love.

Your own son

Mrs. Sara Bull on her third visit to India, arrived in Calcutta on 7th June 1903 travelling via Japan and Hong Kong. She stayed for two weeks with Professor Bose and recovered from sickness caused by long travel. It was during this visit that Mrs. Bull opened a joint bank account with Professor Bose. One reason for this was to provide continuing financial support to Miss. Margaret Noble (Sister Nivedita) who was running a school for educating women in Calcutta and teaching there. Mrs. Bull left for Europe in the first week of November 1903 carrying with her part of the manuscripts from Professor Bose for publication of his second book (Bose, 1906) on inter-disciplinary science research.

Soon after the book was published, Mrs. Bull decided to deliver in several installments the US \$20,000 promised to Professor Bose on January 2nd, 1902. She modified her Will on 5th April 1906 (Fig. 11) to deliver the funds in four installments by the middle of 1909. This was done through the joint bank account maintained by Mrs. Bull and Professor Bose at the Grindlays' Bank in Calcutta, India. Five years later after Mrs. Bull's death on 18th January 1911, her last Will of 1910 was probated in a Probate court in the United States. Testifying in the Court proceedings, Mrs. Bull's brother Mr. Joseph Gilbert Thorpe Jr. confirmed (Fig. 14) the delivery of this US \$20,000 amount pledged on 2nd January 1902 and further confirmed that this fund was earmarked for the purchase of the land (*Punyo Angon*) for the inter-disciplinary research Institute in Calcutta.

Nearly six years after his return from the European tour, Professor Bose again embarked on another scientific visit to the West, this time going to the United States of America for the first time at the invitation of Mrs. Sara Chapman Bull. Professor Bose and Mrs. Bose travelling with Miss.

BE IT KNOWN

That I, SARA C. BULL, widow, now of Cambridge in the County of Middlesex and Commonwealth of Massachusetts, being of full age and of sound mind, do make this my last Will and Testament, hereby revoking all wills heretofore made.

* * * * *

SEVENTH: I have promised my friend, Dr. Jagadis Chunder Bose of the University of Calcutta, India, to furnish him for his scientific work the sum of Five Thousand dollars in each of the years 1906, 1907, and 1908.

I therefore give and bequeath to the said Dr. Jagadis Chunder Bose for his own use, but to the end that he may apply the same to his scientific work above indicated, but without obligation to so apply it or account therefor, such of said three sums of Five Thousand dollars each as shall not at the date of my death have been paid to him by me, it being my intention to leave with this Will the evidence of such payments as I may so make (*I have already paid One Thousand dollars in account of the sum for 1906*)

Each sum of money payable to the said Dr. Jagadis Chunder Bose pursuant to this legacy is to be paid during the year I should have paid it, if living, and is to be paid without interest, and only in the event that the said Dr. Jagadis Chunder Bose is living at the date of such payment.

* * * * *

IN WITNESS WHEREOF, I hereto set my hand and seal and publish and declare this my last Will and Testament in the presence of the witnesses named below, this *fifth* day of April, in the year nineteen hundred and six.

Sara C. Bull 

Fig. 11. Excerpts from the new updated Will of Mrs. Sara Chapman Bull, April 5, 1906 setting the time table for early delivery of U.S. \$20,000, bequeathed earlier to Professor J. C. Bose for his inter-disciplinary research laboratory.

Margaret Elizabeth Noble, stayed as guests in Mrs. Bull's house at 168 Brattle Street in Cambridge, Massachusetts near the Harvard University and delivered several scientific lectures with experimental demonstrations in Universities located in and around various cities of the United States. Preliminary planning and discussions for the independent research Institute in Calcutta were held at Mrs. Bull's house at this time. Upon return from this very successful and rewarding trip, Professor Bose in a letter dated August 11, 1909 described the state of affairs in Calcutta including his current experiences with the Presidency College.

It must be emphatically mentioned here that the local colonial British authorities of the education department, including the Principals of the college and the Directors of Public instruction throughout Professor's Bose's entire stay at the college created and maintained very hostile environment for his research. This is strongly reflected in many letters Professor Bose wrote to Mrs. Bull including this one transcribed and reproduced below in full (Fig. 12):

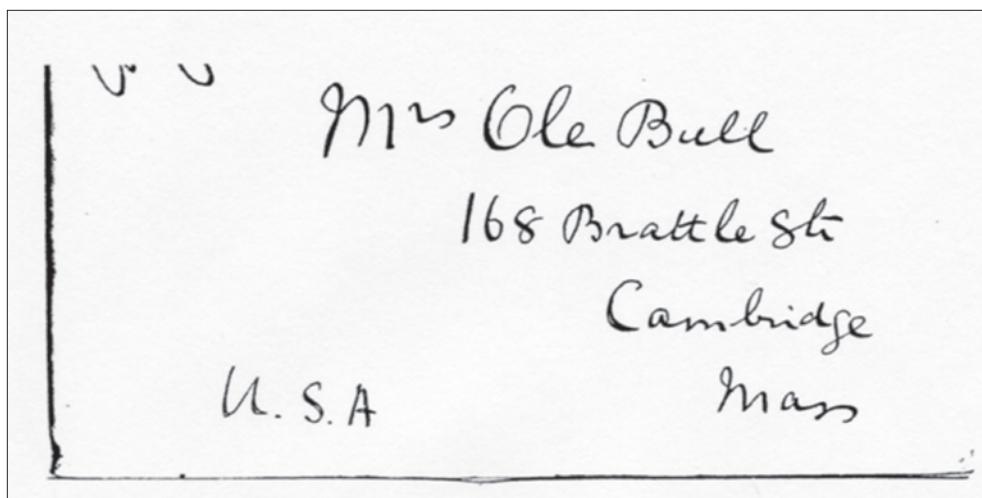


Fig. 12. Envelope cover of hand-written letter of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, August 11, 1909, confirming receipt of the first U.S. \$20,000 gift paid in equivalent British pounds, with discussion of plans to utilize the funds towards purchase of the land (*Punyo Angon*) on which the Bose Institute came into existence on 30th November 1917.

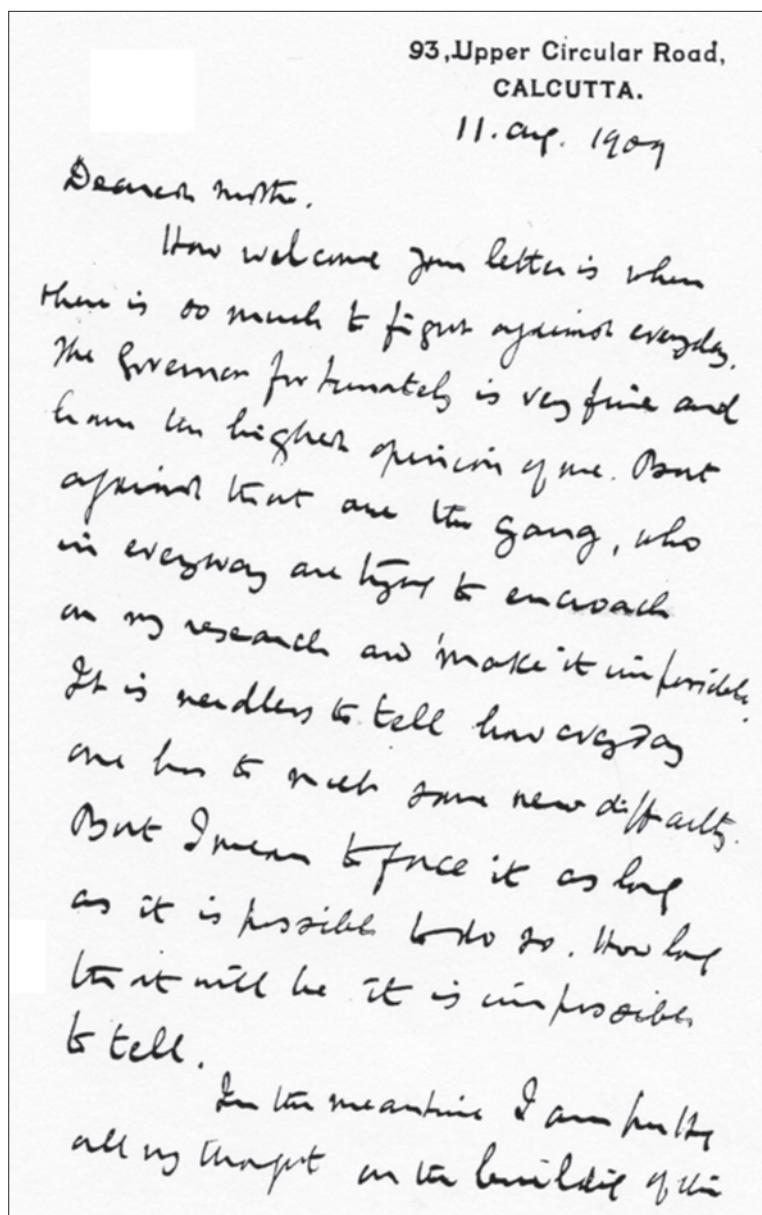


Fig. 12. Hand-written letter (page 1) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, August 11, 1909, confirming receipt of the first U.S.\$20,000 gift paid in equivalent British pounds, with discussion of plans to utilize the funds towards purchase of the land (*Punyo Angon*) on which the Bose Institute came into existence on 30th November 1917.

laboratory or workshop. The difficulty is this. The ~~soon~~ landlord is in the eve of bankruptcy, and his property will be sold by auction. This should have taken place last May, but the creditors want to get their best offers. Hence the property in Poona is being sold now; after that is accomplished, the Calcutta property will be sold in the course of a month or so. In legal affairs it is difficult to be certain of him. I tried to buy by private arrangement from the landlord, but the Court will not allow it. There is another plot, not so conveniently situated, which I can buy at once, but there

Fig. 12. Hand-written letter (page 2) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, August 11, 1909, confirming receipt of the first U.S. \$20,000 gift paid in equivalent British pounds, with discussion of plans to utilize the funds towards purchase of the land (*punyo Angon*) on which the Bose Institute came into existence on 30th November 1917.

of him is very high.
Pending this, I am making
additional arrangements
where the work could be carried
out temporarily.
The fund remains as follows:
4000£ from you. Now when Mrs Chapman
was in Wiesbaden, one of her
friends (Mrs Rutherford Jackson)
gave 20£; this is an addition of
200£ which James wanted her
husband to contribute as her
contribution. If I have to buy
the whole plot of land in one block,
then I fear the entire amount
will have to be spent; but we shall
get ~~the~~ back good value on reselling.

Fig. 12. Hand-written letter (page 3) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, August 11, 1909, confirming receipt of the first U.S. \$20,000 gift paid in equivalent British pounds, with discussion of plans to utilize the funds towards purchase of the land (*Punyo Angon*) on which the Bose Institute came into existence on 30th November 1917.

the superfluous portion.

Your brother & sister has been exceedingly kind to me and so I want to send Mrs Sharp some Indian things by about the next Mail Parcel Post. There is however no trouble of your exorbitant tariff. I will therefore send the article to you so that you need get it & give it to your sister.

How I wish that everyone belonging to you be about you. May you always be surrounded by love. You have promised me to take every care of yourself. I send you all my heartfelt love. Bless you dear one. We are in this land

Yours ever affectionately
Jagadis Chunder Bose

Fig. 12. Hand-written letter (page 4) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, August 11, 1909, confirming receipt of the first U.S. \$20,000 gift paid in equivalent British pounds, with discussion of plans to utilize the funds towards purchase of the land (*Punyo Angon*) on which the Bose Institute came into existence on 30th November 1917.

93, Upper Circular Road
CALCUTTA
11 aug. 1909

Dearest Mother,

How welcome your letter is when there is so much to fight against every day. The Governor fortunately is very fine and have the highest opinion of me. But against that are the gang, who in everyway are trying to encroach on my research and make it impossible. It is needless to tell how everyday one has to meet some new difficulty. But I mean to face it as long as it is possible to do so. How long that will be it is impossible to tell.

In the meantime I am putting all my thought on the building of the laboratory & workshop. The difficulty is this. The landlord is on the eve of bankruptcy, and his property will be sold by auction. This should have taken place last May, but the creditors want to get the best offers. Hence the property in Burma is being sold now; after that is accepted, the Calcutta property will be sold in the course of a month or so. In legal affairs it is difficult to be certain of time. I tried to buy by private arrangement from the landlord, but the Court will not allow it. There is another plot, not so conveniently situated, which I can buy at once; the price of this is very high.

Pending this, I am making additional annex to my house where the work could be carried out temporarily.

The fund remains as follows: 4000 £ from you. Then when Miss McLeod was in Wimbledon, one of her friends (Mrs. Rothenberger I believe) sent 20 £.; then in addition to 200 £. which you have wanted to be put in the Laboratory as her contribution. If I have to buy the whole plot of land in one block, then I fear the entire amount will have to be spent; but we shall get back good portion on reselling the superfluous portion.

Your brother and sister has been exceedingly kind to me and Bo. I want to send Mrs. Thorp some Indian thing by about the next mail Parcel Post. There is however the trouble of your exorbitant tariff. I will therefore send the article to you so that you could get it and give it to your sister.

How I wish that everyone belonging to you be about you. May you always be surrounded by love. You have promised me to take every care of yourself. I wish you all my heartfelt love. Bless you dear one. We are in His hands.

Your own affectionate son.

6. DATE OF CONCEPTION OF THE BOSE INSTITUTE

As just stated, the American woman pioneer Sara Chapman Bull, directly inspired by the distinguished Bengali Indian philosopher Narendranath Datta (widely known as Swami Vivekananda or Swami Vivekanand Ji), signed her Will on 2nd January 1902 committing unrestricted gift of US \$20,000 to Professor Jagadis Chunder Bose towards establishment of his inter-disciplinary research laboratory in Calcutta, India. The January 2nd, 1902 is the formal date of conception of the Bose institute (*Mātrimandir Punyo Angon*).

In a letter (Sen, 1994) to poet Rabindranath Tagore, written in Bengali language (Fig. 5), dated 20th July 1901, Professor Bose strongly expressed his profound disappointment with local hostile British colonial education department authorities who made conscious efforts to defeat the proposal for a research laboratory for Professor Bose at the Presidency College in Calcutta recommended by distinguished Presidents and members of the British Royal Society. This letter is the definitive historical proof that the conception of a distinctly separate independent research Institute did not originate till this date of the letter. Prior to this date all thoughts and efforts were dedicated towards establishing a research laboratory at the Presidency College, then, a British colonial government run teaching institution under the Calcutta University. Claims made over the years by many that the idea of the Bose Institute, a research Institute independent from the Presidency College, Calcutta originated prior to this date of conception (2nd January 1902) are not in tune with the truth.

Professor Bose died on 23rd November 1937 not knowing his entire life when India will achieve independence. Throughout his entire stay at the Presidency College he constantly faced a very hostile research environment created and maintained by the immediate first two layers of local academic administrators (the Principals of the College and the Directors of Public Instruction of the colonial Bengal government). Professor Bose had to keep the massive financial support he received from Mrs. Bull, secret and there is no open acknowledgment of it in his inaugural address of 30th November 1917 (Bose, 1917).

7. PURCHASING THE LAND FOR THE BOSE INSTITUTE

Soon after returning from the United States of America and Europe, Professor Bose communicated to Mrs. Sara Bull through many hand-written letters during 1909-1910 that the first gift of US \$20,000 will be utilized mostly towards purchase of the land for his inter-disciplinary research Institute. He was scouting for the land in the immediate neighbourhood of his home at 93 Upper Circular Road, Calcutta. This information was communicated to her brother Joseph G. Thorpe Jr. (Fig. 13) who was responsible for actually transmitting the funds over the years through a joint account that Mrs. Bull maintained with Professor Bose in the Grindley & Company Bank in Calcutta to support her interests in India, the birth place of her beloved husband's violin. Excerpts from Mr. Thorpe Jr.'s probate court testimony in 1911 presented in Fig. 14 is the decisive and conclusive proof that Mrs. Sara Chapman Bull of the United States of America paid for the land (*Punyo Angon*) on which the original Bose Institute stands.



Fig. 13. Mr. Joseph Gilbert Thorpe Jr. with his sister Mrs. Sara Chapman Bull.

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Q - Can you tell us the amounts and dates of her withdrawals from her principal to give to these what we call Indian interests?

A - April and July, 1909, on those two dates she instructed me to forward in the first instance a thousand pounds; in the next instance three thousand pounds for Dr. Bose's work in India, Dr. Bose's laboratory work in India.

Q - (By Mr. Bartlett) What was that date?

A - April, 1909, April and July.

Q - April, 1909, was the first?

A - Yes.

Q - You forwarded then---

A - A thousand pounds.

Q - Something under five thousand dollars. To whom?

A - To the bank, to Grindley & Company, Calcutta, bankers.

Q - To be drawn by this Dr. Bose?

A - Dr. Bose or Mrs. Bull, to be entered to the joint account.

* * * * *

Q - Was she in India at the time?

A - I should imagine she was not, no.

Q - Then in July she ordered you to send---

A - Three thousand pounds, making substantially \$20,000 in all.

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Q - \$20,000 in all; that is the year before her death?

A - She died January, 1911; nearly two years.

* * * * *

Q - Do you find any reports in Mrs. Bull's papers as to how this \$20,000 was used?

A - I find references to the general purpose, the purchase of land for Dr. Bose's laboratory adjoining his house.

Q - Where is his house?

A - In Calcutta.

Fig. 14. Relevant excerpts from the Probate Court testimony of Mr. Joseph Gilbert Thorpe Jr. (Sara's brother) confirming the delivery of twenty thousand U.S. dollars (in equivalent British pounds installments) to Professor Bose in Calcutta, India during 1906-1909 to be utilized towards purchase of the land (*Punyo Angon*) for the inter-disciplinary research laboratory.

8. MRS. SARA CHAPMAN BULL'S GIFT IN HISTORICAL PERSPECTIVE

Mrs. Sara Chapman Bull's unrestricted first gift of US \$20,000 to Professor Jagadis Chunder Bose for the establishment of his research laboratory in Calcutta, India needs to be quantitatively evaluated in correct historical perspective to appreciate the magnitude of her generosity. This massive amount of money originally pledged on January 2nd, 1902 and delivered in four installments during 1906-1909, will now be compared against the monetary amount of the Nobel Prize in physics.

Inventor of the dynamite, Alfred B. Nobel of Sweden accumulated a sizeable fortune from his successful dynamite business in the late nineteenth century. When he died in 1896, Mr. Nobel bequeathed his fortune through a Will to establish the five world-famous Nobel Prizes awarded yearly since 1901 on the 10th December, the day of his death. The first award amount has been considered as reference amount of 100 percent. The monetary value of the 1902 Prize was Swedish Kroner (SEK) 141,847. As shown in Fig. 15, its present day (Year 2010) monetary value is SEK 7,578,069. Over the one hundred eight years, the growth factor has been $(7,578,069/141,847)$ or 53.42424584 times representing conservative investment of philanthropist Alfred B. Nobel's legacy.

Using the same conservative rate of growth for the 1902 Nobel Prize amount in Swedish Kroner, the Year 2010 value of Mrs. Sara Chapman Bull's 2nd January 1902 gift of US \$20,000 will be $53.42424584 \times \$20,000 = \text{U.S. } \$1,068,485$. The exchange rate on 2nd January 2010 was (Exchange Rate, 2010): US 1\$ = 7.1581SEK. Using this conversion factor, the U.S. dollar value of the 1902 Nobel Prize in the Year 2010 would have been US \$(7,578,069/7.1581) = \text{US } \\$1,058,670. This confirms and conclusively proves that Mrs. Sara Chapman Bull's this first unrestricted gift is equivalent in amount to that of the 1902 Nobel Prize.

Mrs. Bull's second gift of US \$20,000 bequeathed on 14th July 1910 (discussed in section 9) with a growth factor of $(6,704,308/140,703) = 47.64864999$ would have been, after one hundred years, worth US \$(47.64864999 x \$20,000) = US \$952,973. With the exchange rate (Exchange Rate, 2010) of US 1\$ = 7.3865 SEK on 14th July 2010, the Year 2010 equivalent of the 1910 Nobel Prize is US \$(6,704,308/7.3865) = \text{US } \\$907,643. Therefore, her second gift was equivalent in amount to that of the 1910 Nobel Prize.

PRIZE AMOUNT AND MARKET VALUE OF INVESTED CAPITAL CONVERTED INTO 2010 YEAR'S MONETARY VALUE				
Year	Index number yearly average	Prize amount nominal value SEK	Monetary value December 2010 SEK	Value in % compared to original amount in 1901
1901	33	150 782	8 055 414	100%
1902	33	141 847	7 578 069	94%
1903	34	141 358	7 329 828	91%
1904	34	140 859	7 303 953	91%
1905	34	138 089	7 160 321	89%
1906	35	138 536	6 978 256	87%
1907	37	138 796	6 613 442	82%
1908	37	139 800	6 661 281	83%
1909	37	139 800	6 661 281	83%
1910	37	140 703	6 704 308	83%
1911	36	140 695	6 890 147	86%
1912	39	140 476	6 350 236	79%
1913	39	143 010	6 464 785	80%
1914	39	146 900	6 640 633	82%
1915	45	149 223	5 846 226	73%
1916	51	131 793	4 555 903	57%
1917	64	133 823	3 686 405	46%
1918	91	138 198	2 677 396	33%
1919	105	133 127	2 235 266	28%
1920	105	134 100	2 251 603	28%
1921	90	121 573	2 381 480	30%
1922	73	122 483	2 958 048	37%
1923	68	114 935	2 979 859	37%
1924	68	116 719	3 026 112	38%
1925	69	118 165	3 019 201	37%
1926	67	116 960	3 077 619	38%
1927	66	126 501	3 379 110	42%
1928	66	156 939	4 192 174	52%
1929	66	172 760	4 614 786	57%
1930	64	172 947	4 764 149	59%
1931	62	173 206	4 925 196	61%
1932	61	171 753	4 963 943	62%
2000	1 489	9 000 000	10 656 145	132%
2001	1 525	10 000 000	11 560 656	144%
2002	1 558	10 000 000	11 315 789	140%
2003	1 588	10 000 000	11 102 015	138%
2004	1 594	10 000 000	11 060 226	137%
2005	1 601	10 000 000	11 011 868	137%
2006	1 635	10 000 000	10 782 875	134%
2007	1 692	10 000 000	10 419 622	129%
2008	1 707	10 000 000	10 328 061	128%
2009	1 723	10 000 000	10 232 153	127%
2010 Dec	1 763	10 000 000	10 000 000	124%

Fig. 15. Excerpts from Nobel Prize amount nominal values published by the Nobel Foundation of Sweden. The table shows monetary values of the Nobel Prize amounts as of December 2010.

9. MRS. SARA CHAPMAN BULL'S FURTHER COMMITMENT FOR THE MAIN BUILDING OF THE BOSE INSTITUTE

After receiving the first gift of US \$20,000 by 1909 Professor Bose realized that he needs more money to build the research institute in Calcutta. Accordingly Professor Bose in his regular correspondence with Mrs. Bull whom she addressed as 'Dearest Mother' or 'My darling mother', reported on progress he was making in all fronts and the local situations he was facing. This included his ongoing skirmishes with lower level college administrators, difficulties with land acquisitions for the future research laboratory etc. One such historically very important letter dated 9th March 1910 in his own hand-writing is presented here (Fig. 16) in full to get an accurate sense of what Professor Bose was thinking on that particular day. Professor Bose informed that he will immediately embark upon building additional floors over his house to include a laboratory and a lecture hall. These were done in due time. This letter provides the historical proof to assert that Professor Bose's residence at 93 Upper Circular Road, Calcutta, now known as '*Ācārya Bhavan*', is indeed the version-I of the Bose Institute.

Responding to the need, Mrs. Bull created a new Will on 14th July 1910 (Fig. 17) in which she committed another US \$20,000 towards creation and maintenance of the research Institute. Relevant excerpts from this latest Will are reproduced in Fig. 17 from the original. The original commitment was U.S. \$2,000 every year for ten consecutive years totaling US \$20,000. Since the last Will was probated in 1911 at the insistence of her only daughter Mrs. Olea Bull Vaughan (who was suffering from tuberculosis at that time and died on 18th July 1911), an agreement was reached between the two parties involved in the probate court action and Professor Bose received the funds bequeathed in the Will from Sara's brother Joseph G. Thorpe Jr. This has been confirmed in contemporary local newspaper reports. Further details on this transaction are currently under continuing investigation by the present authors and will be reported in a future article on this subject. Professor Bose utilized this fund to build the main building of the Bose Institute (*Mātrīmandir*) adjacent to his home and it was inaugurated on 30th November 1917, Professor Bose's fifty-ninth birthday.

Professor Bose's letter is transcribed below followed by reproduction of the original hand-writing.

9. 3. 1910

Dearest Mother,

It was such a nice letter you wrote ! How soothing you are. Thank you for all your loving thoughts.

It does seem that all that is nearest and dearest to us have been gathered on the other side. Yet during the short time we have here we have to do all that we wished to be left as our offering. It was difficult to centre the mind once more; but now you will be pleased to hear that the inspiration is in full play. I never had such a rush of clear thoughts, and experimental foresight as now. I had hitherto relied on Suresh for manufacture of apparatus. But the visit to America has spoilt him a little, and so I thought of not depending much on him. As a result, the instruments which I have devised with the help of a common mechanic is so wonderfully perfect that it leaves all others in the shade. Many things are possible now which were on my mind as dreams. There opens out such a vast tract of work, and new instruments of precision from all laboratories, that for the next 5 years at least I shall be but too fully engaged.

Now there is one thing which had caused such a disappointment that I could not bear mention it even to you. It was about the proposed ground for the Laboratory. The owner is a rogue, and I went so far as to offer 8000£ for the land alone. That would have ruined me. Fortunately my offer was not accepted. It was all fictitious bid. They have not been able to sell the land yet. Perhaps there may be a chance left.

But what I see is that I can not rely on any one but myself. If I do not get the land, I am determined to build third and fourth storeys on my house and give it up to the Laboratory. As long as I live I shall use the first two storeys, afterwards these will be the rooms for the Superintendent and manager. The third and fourth floors will be entirely given to research. The land will have eaten up all our resources; the additional building and fittings would cost about 2000 £ add to this apparatus worth 2000 £, total 4000 £. I shall myself leave something from whose interest repairs and taxes could be met.

I see that every door is closed against us. All activities are restrained; at least one thing we can do and that shall be done.

I hope to begin another book about next year. Give me your blessing dear one.

That man about whom you warned is here. All your worst suspicions about that man is I fear confirmed. Have been trying to play tricks, but failed. I hope there will be end of his attempts to fasten himself on others.

You will have heard of the visit of Lady Minto. This was very welcome, and makes things more tolerable.

With much much love

From your own son.

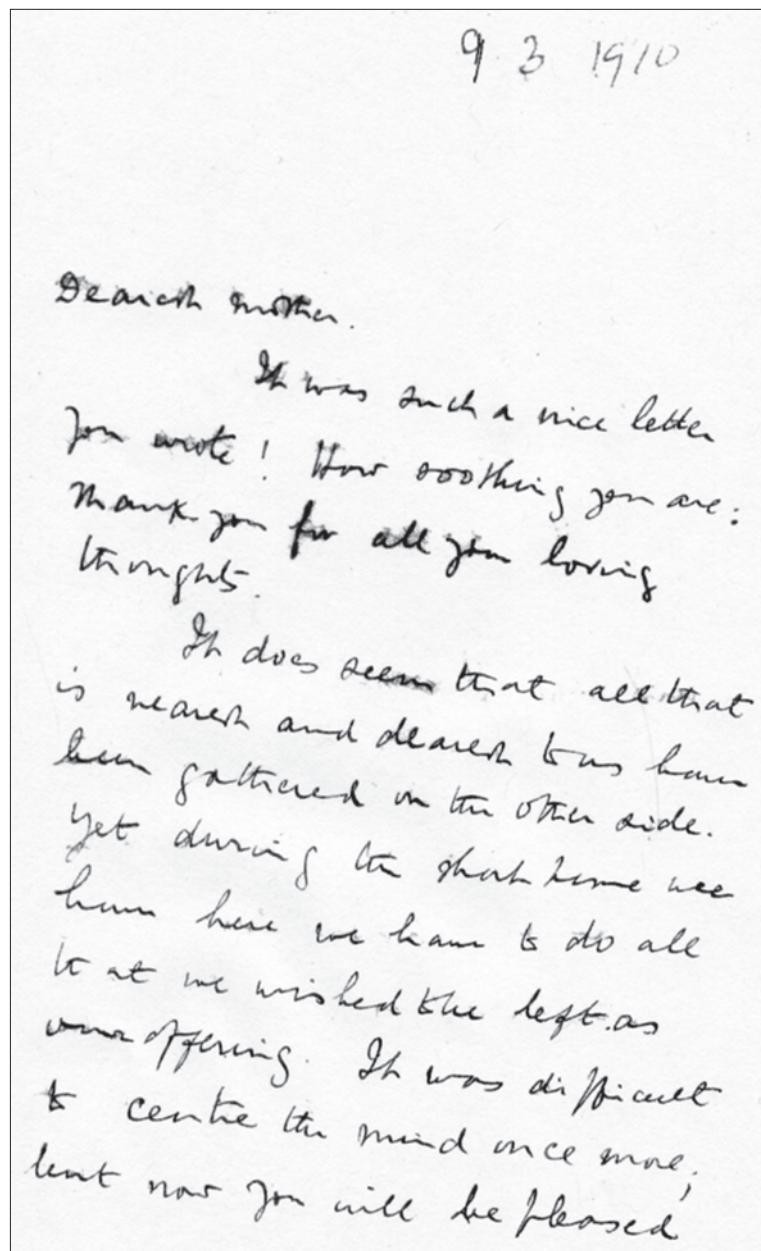


Fig. 16. Hand-written letter (page 1) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

I hear that his inspiration is in full play. I never had such a rush of clear thoughts, and experimental foresight as now. I had hitherto relied on Suresh for manufacture of apparatus. But the visit to America has spoilt him a little, and so I thought of not depending much on him. As a result, the instrument which I have devised with the help of a common mechanic is so wonderfully perfect that it has all these

Fig. 16. Hand-written letter (page 2) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

in the shade. Many things
are possible now which were
on my mind as dreams.
There opens out such a vast
tract of work, and new
instruments of precision for
all laboratories, that for
the next ~~to~~ 5 years at
least I shall be but
fully engaged.

Now there is one thing
which had caused such
a disappointment that
I could not bear mentioning it
even by you. It was about

Fig. 16. Hand-written letter (page 3) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

on proposed ground for
the Laboratory. The owner is
a rogue, and I went so far
as to offer 8000/- for the
land alone. That would
have ruined me. Fortunately,
my offer was not accepted.
It was all fictitious bid.
They have not been able to
sell the land yet. Perhaps
there may be a chance left.
But what I see is
that I can not rely on
any one but myself.

Fig. 16. Hand-written letter (page 4) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

If I do not get the land,
I am determined to build
third and fourth storeys
on my own house and
furnish it up ~~the~~ laboratory.
As long as I live I shall
use the first two storeys,
afterwards there will be
large rooms for the Supervisor
and Manager. The third
and fourth floors will be
entirely given to research.
The land will have eaten
up all our resources;
the additional building

Fig. 16. Hand-written letter (page 5) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

are fittings wanted cash
 about 2000/-
 add 60%is approx., ^{with} 2000/-
 Total 4000/-
 I shall ^{myself} leave ~~at~~ something
 fun whose interest expands
 and losses could be met.
 I see that every door
 is closed against us.
 All activities are restrained,
 at least one thing we can
 do, and that shall be
 done.
 I hope to begin
 another book about next

Fig. 16. Hand-written letter (page 6) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

Year. give me your blessing
dear one.

That man about whom you
warned is here. All your worst
suspicions about that man
is I fear confirmed. He has
been trying to play tricks, but
failed. I hope he will be
end of his attempts to fasten
himself on others.

You will have heard
of the visit of Lady Irwin.
This was very welcome, and
makes things more tolerable.
With much love
for your dear son

Fig. 16. Hand-written letter (page 7) of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events, progress towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.



Fig. 16. Envelope cover of the hand-written letter of Professor Jagadis Chunder Bose to Mrs. Sara Chapman Bull, March 9th, 1910, describing contemporary events towards establishment of the research laboratory, and making a strong case for additional funds for the laboratory building.

10. REALIZATION OF THE INTER-DISCIPLINARY RESEARCH INSTITUTE (*MATRIMANDIR PUNYO ANGON*)

The research laboratory that Professor Jagadis Chunder Bose wanted very much in 1896 at the Presidency College and for which Lord Kelvin (President of the Royal Society, Great Britain, 1890-1895) first requested in his own hand-writing on October 23, 1896 to Lord George Hamilton (Secretary of State for India, 1895-1903) but denied by the local British colonial authorities (which included Edward Norman Baker, a British ICS

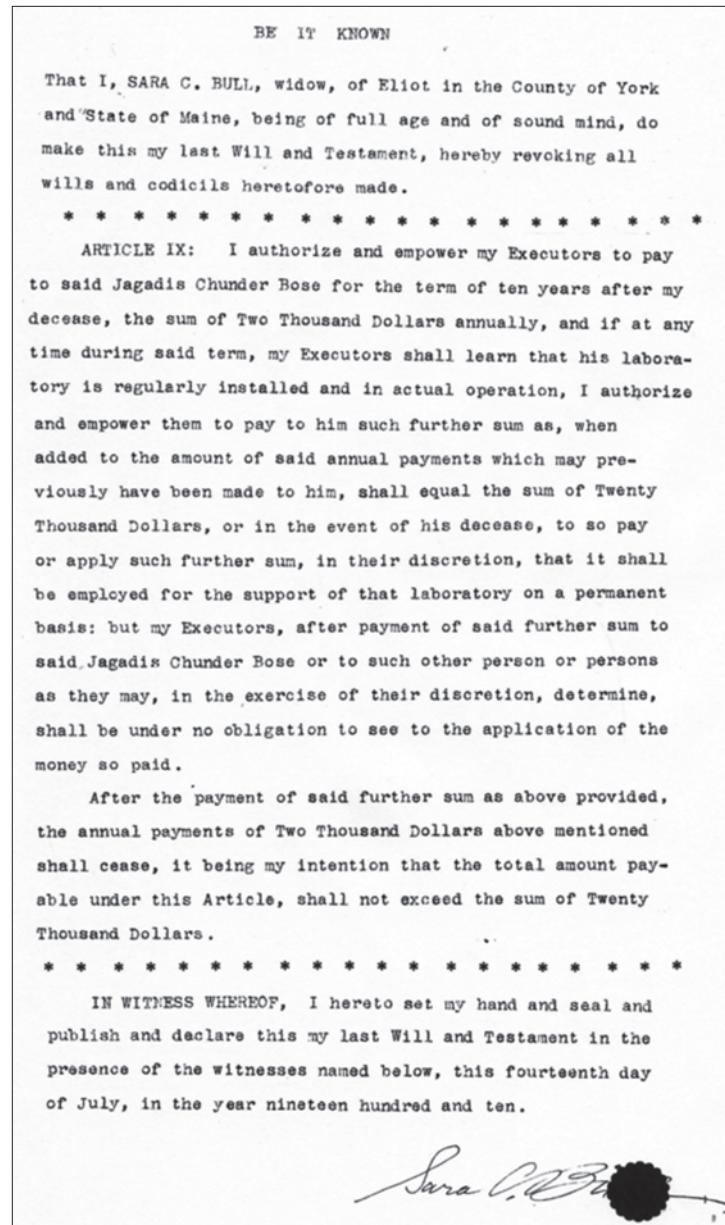


Fig. 17. Excerpts from the new Will of Mrs. Sara Chapman Bull, July 14, 1910 bequeathing an additional US \$20,000 to Professor J. C. Bose for construction and maintenance of his inter-disciplinary research laboratory. This additional funds created the main building (*Mātrīmandir*) of the Bose Institute in Calcutta on 30th November 1917.

Officer, then functioning as Financial Secretary to the Government of Bengal, 1898-1902), finally came into existence on 30th November 1917 with massive unrestricted gifts from American woman pioneer Mrs. Sara Chapman Bull.

Great Bengali Indian philosopher Narendranath Datta (Swami Vivekanand Ji), the ‘Son’ in the ‘Holy Trinity’ that the violin assembled and the central figure towards getting the research institute established, died in Belur, near Calcutta on 4th July 1902. Professor Bose never met him again since that day in October 1900 in Paris Science Congress, where Professor Bose the world pioneer of Inter-disciplinary science research presented his revolutionary paper (Bose, 1900) bridging physical science with life science.

Mrs. Sara Chapman Bull, the ‘Dearest Mother’, died in the early hours of the morning of 18th January 1911 in Cambridge, Massachusetts, U.S.A. She was ill, but active, for about a year. Miss Margaret Elizabeth Noble, (as Sister Nivedita, in India) the ‘Great Spirit’ in the ‘Holy Trinity’, travelled to the United States during October-November 1910 to be near Mrs. Bull during the last days, leaving her pet Indian squirrel with Professor Bose. Miss Noble returned to India on April 7, 1911. She died in Darjeeling, India, on 13th October 1911 in care of Professor and Mrs. Bose.

The legend has it that it was Miss Noble’s original idea to place the symbolic ‘Thunderbolt’ insignia on top of the Main Building of the Bose Institute. Professor Bose in his inaugural address described this as (Bose, 1917):

‘Asoka’s emblem of the Amlaki will be seen on the cornices of the Institute and towering above all is the symbol of the thunderbolt. It was the Rishi Dadhichi, the pure and blameless, who offered his life that the divine weapon, the thunderbolt, might be fashioned out of his bones to smite evil and exalt righteousness.’

Miss Noble’s precise pivotal contributions towards establishment of the Bose Institute require separate special historical attention and will be presented in a future paper by the present authors.

Mrs. Sara Chapman Bull’s most prized inherited possession, the 1687 Stradivari Violin, *Ole Bull*, remained with her till her death in 1911. Passing through her descendants over the years, the violin finally found its permanent

resting place in the collections of the Smithsonian Institution of the United States of America in Washington, DC (Smithsonian, 2006).

Mrs. Sara Chapman Bull's glorious contributions remain immortalized in the first three words (*Mātrimandir Punyo Angon* – Mother's Temple, Sacred Premises) of the song specially composed by Nobel laureate (1913) poet Rabindranath Tagore for the inauguration of the Institute. This song in Tagore's own hand-writing in Bengali language along with an approximate English translation of the updated version in the *Geetbitan* (Fig. 18), is reproduced below, in full, to capture the importance and significance of the birth of the world's first inter-disciplinary science research Institute, — a momentous event in the glorious history of India.

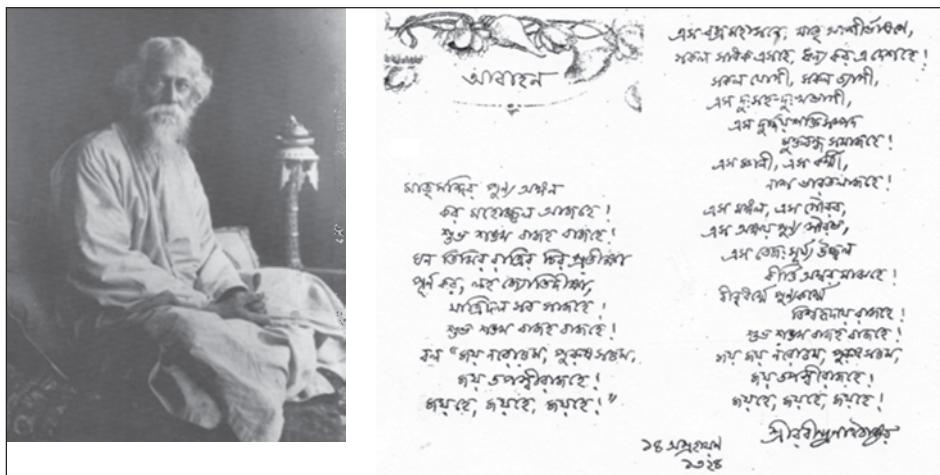


Fig. 18. Nobel laureate Poet Rabindranath Tagore and '*Matrimandir Punyo Angon*', the inaugural song (Tagore, *Geetbitan*) composed by him (in Bengali language) for the inauguration of the Bose Institute on 30th November 1917, followed by an English translation of the song. Mrs. Sara Chapman Bull remains immortalized in the first three words of this song.

MĀTRIMANDIR PUNYO ANGON

Mother's Temple, Sacred Premises — make it shine today in dazzling brilliance,
 Come, all Ye blessed sons, assemble with august presence,
 Blow, blow, the Conch shell in auspicious celebration.
 Fulfill the long awaited expectations of the deep dark nights
 And take initiations in the New Light

Be ready, all fellow pilgrims.
Blow, blow, the Conch shell in auspicious celebration.
O, say - victory to the great man – the person extraordinaire,
Victory to you, the exalted king of ascetics,
Victory, Victory, Victory, Victory to thee.
O, come ascending the great thunder- throne with Mother's blessings
O, come all devotees, enrich this country and make her proud.
O, come all ascetics, all selfless devotees come all those who undergo
unbearable suffering,
Come in reservoir of indomitable power, in free and fearless society.
O, come Ye all Wise men, all workers, bring end to India's shame
O, come in auspicious abundance, come, glory,
Come in everlasting blissful fragrance,
Come; bring glorious achievements glowing like burning suns in the sky.
Through heroic goals and virtuous deeds, reign in the hearts of the World!
Blow, blow, the Conch shell in auspicious celebration.
Victory, Victory to the great man, the person extraordinaire,
Victory to you—the exalted king of ascetics,
Victory, Victory, Victory, Victory to thee!

11. ACKNOWLEDGMENT

This paper is based on a lecture delivered by the first author at the main lecture hall of the Bose Institute in Calcutta (Kolkata), India on 22nd October 2011 at 11:00 AM to mark the centennial of the realization of the funds for this Main Building of the Bose Institute, the occasion of the 100th anniversary of the deaths of Miss Margaret Elizabeth Noble (Sister Nivedita) and American woman pioneer Sara Chapman Bull. The authors are grateful to all the archivists and their assistants connected with the papers of Sara Chapman Bull in the United States of America for their invaluable help in providing the historical documents.

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