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J. C. Bose's Scientific Inventions Confirmed the Truth of Consciousness

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Abstract

A world leader in telecommunications, Bose was a significant figure behind the creation of modern radio and sonic technology. In 1896 his work was commemorated by IEEE as the oldest "milestone achievement" from Asia. In 1997 the Institute of Electrical and Electronic Engineers of America named Bose as a "Father of Radio Science." Royal Society of England was impressed by a research paper of Bose on electro-magnetic waves and they honoured him with a Degree of Doctorate in Science. He was knighted in 1917, and made a Fellow of the Royal Society in 1920 (the first Indian to become a fellow for science as opposed to mathematics).

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A kind of astonishing wonder and irritability was perceptible when he declared that all living and non-living species of the world like man, animal, plant and metal are originally ONE. This declaration was perfectly in conformity with such a declaration in India's ancient scriptures, Upanishad, like "*Sarbam khalvidam Brahma*" (All this is Brahman) and "*Ekam evadvitiam*" (One without a second). His opponents in Europe were ready to confront him with bolstering bullets of questions during his lecturedemonstration session. Ancient Rishis

of India were seers and hearers of Truth; to them what they uttered were Truths as emanating from the divine source coming to them through hearing and vision.

Bose too was a seer like his forefathers but his utterances weren't accepted by his modern skeptic audiences. He was equipped with scientific proofs to prove the Truth of what his forefathers uttered.

Bose's flawless proof for every hypothesis silenced the critics and he was eulogized as the **Great Experimentalist** by the Press and Public. Global invitations followed from France, Germany, Sweden and Egypt. He travelled more. He declared the world as an oyster for laboratory. His Book: *Response of the Living and the Non-Living* was published in 1902.

"The seeking and shrinking of the plant, its pleasure and pain, its sleep and its wakefulness and all that strange life whose truth an Indian scientist has brought to light by rigidly scientific methods, are all movements of consciousness." Sri Aurobindo confirmed.

Introduction

Sir J. C. Bose was a great man and versatile scientist. He was a polymath; litterateur educationist, philosopher, god lover, patriot and above all one of the greatest scientists of the world for all times to come. As a scientist he was not confined to one branch of science but moved to different branches of it like physics, biology, botany and more, as per his comprehensive vision of the origin and nature of objects and beings. His scientific inventions were attuned to his philosophic ideas moulded by Vedas and Upanishads, by the teachings of the great Rishis of ancient India. He always moved ahead of his time. 160 years after his birth and 125 years after the beginning of his scientific inventions many of his theories, ideas and machines are utilized in different branches of modern science. He lives through his works and ideas which include humanities. His scientific inventions proved that everything, beings

and non-beings, is Brahman, as said the Upanishad repeating the truth that everything is replete with consciousness.

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The Scientist

It was observed that he worked like an ascetic in the world of science and was determined to overcome all adversaries; man and environment. At his time a man in a British colony was denied many usual facilities. He had no laboratory so he made one in the rest room of Presidency College. Once later he revived his practice while convalescing in the UK home of Margaret Noble (known as Siste Nivedita, as named by her Guru, Swami Vivekananda). It is said that in the early stage the professor would resort to conducting elaborate experiments inside his 24 square feet room in downtown Calcutta in which he struggled to keep all his scientific equipments. Not only that he made epoch making inventions he devised appropriate instruments to test and prove his experiments which are still in use in scientific world either in their pristine form or otherwise. The scientific contributions of Bose in both physical and biological sciences are colossal. Remarkably, this

feat was achieved under the colonial rule with severe constraints and well-documented instances of racism.

A physicist par excellence, J. C. Bose was the first in the world to initiate interdisciplinary research by probing plants from the vantage point of physics - an integrated biophysical view of life. His studies on coherer led to the discovery of the common nature of the electric response to external stimuli by both animate and inanimate objects.

Whatever he did in discovering the wonder of microwave, he did not go for patenting his discovery. And it is known that Italian Naval Engineer Marconi imitating his design walked away with the noble prize in 1901 by accomplishing the transatlantic communication. It was too late when Sister Nivedita

(Margaret Noble) and her friend Sara Bull, both disciples of Swami Vivekananda, got reluctant Bose's patent application to the USA signed. Bose had refused any attempt by interested business concerns to patent his discoveries earlier:

Sir J.C. Bose demonstrated his wireless millimeterwaves (microwave) experiments at the Royal Institution, London in January 1897. This predates the wireless experiments at Salisbury Plain in May 1897 by Marconi, to whom the Nobel Prize was awarded.

I think that such a person who went on inventing truth after truth without any personal gain, to sign for the victory of Science for mankind, would never have felt sorely for missing the Nobel Award though it has been argued by others that it was by all means proved that Bose was the first and true inventor of the Wireless Telegraphy. If the Nobel Committee considered him as a true deserving candidate they might give him the award for his subsequent epoch making discoveries. Awards are after all bound by legal formalities, conventions and many other considerations. All big awards are perhaps dependent on other considerations like political compulsion, diplomatic relationship, countries and other influences and are subject to proper management. It is not that just genius or merits are

considered. Bose never said why his name was not mentioned in the area of microwaves by the Nobel Committee or by Marconi. It seemed otiose to him. Such persons are bigger than the awards!

Plant Life, Plant World: The Greatest Discovery of Acharya Jagadis Chandra Bose

"All science is transcendental or else passes away. Botany is now acquiring the right theory-the avatars of Brahma will presently be the textbooks of natural history"- Ralph Waldo Emerson Man has been witnessing the birth, growth and death of plants from time immemorial but it was perhaps not considered as living as the animals and humans without their apparent ability to move, talk and hear though plants have been worshipped from ancient time in many religions and civilizations which attributed other qualities to plants including the quality of demigods. Men knew of many aspects of plant world but it was Sir J. C. Bose who asserted for the first time that plants are living beings with many common qualities as are found in man and animal. After him various researches have been made on plant life and man has largely been benefitted by them. Immense possibilities still lie in the womb of the time.

Without going into the physical aspect of plant life spiritual personalities like Mirra Alfassa or The Mother (Spiritual collaborator of Sri Aurobindo) had contacts with them through the other channels like psyche and consciousness. Mother gave names to hundreds of flowers according to their inner nature and spiritual significance when they were brought to her by her disciples from time to time. Like Bose who made many experiments based on the plant Mimosa, she too was fascinated by it. She named its flower 'Vital Sensitivity'.

There is a unique rhythm of consciousness in all creation. Be it man, plant or animal, the fundamental perceptions within them are the same. Plants have life and nervous system. They feel pleasure, pain, love, hatred, fear and joy. They exhibit exhaustion and depression;

and even experience the fear of death and relief on recovery. Life is universal. Emotions are of the same kind, varying in degrees. These are not fantasies created by a poet; but facts demonstrated by a scientist, Acharya J. C. Bose**,** Indian botanist.

He found that plants have 'pulsations', which would make them grow straight or bend. He has answers to the questions why plants always grow towards light and why the roots always grow downwards. Lotus blossoms when sun rises and closes its petals on sun set. He explained that it was due to the rise and fall in temperature, a phenomenon known as the 'thirst for light'. He proved by experiments that even if their roots were removed plants would absorb water using their leaves and stem. He proved that the cells of plants behave like human heart, expanding and contracting with a specific rhythm. With his instruments he recorded the pulse beats of plants and demonstrated their reactions on receiving poison.

He found that all plants would react to our touch but we could not see that reaction because of the limitations of our senses. He designed and developed very delicate and sophisticated instruments to measure the subtle sensations of plants. When you hurt a plant the shock waves are transmitted to its different parts and gradually the plant becomes tired and bends its head down. His instruments could record this! His Crescograph had the enormity of ten million magnifications and it could measure the subtle growth of a plant which was approximately 1/50,000 of an inch per second. 1

The inventor-manufacturer of Crescograph with the help of his wonder instrument made it possible to study conditions which modify plant growth rate. It helped in determining the rate of photosynthesis in plants. It was such a wonder machine that "Scientific American" journal named it something beyond

"Aladdin's wonder lamp". By this magnifier he proved the spasm of life and death in plants; their happiness and sorrow, irritability, lethargy and other reactions. This alarmed the entire world of botany inviting many enemies who tried to oppose out of disbelief or with a

mind to belittle and block his newdiscovery. Bose gladly accepted any challenge and submitted each time to a probe when such occasion arose to prove the truth of his discovery. An incident as below proved the honesty of his purpose which falsified the tricks played by some adversary by the flash of truth-light.

"In 1901 Bose went to England to attend the International Conference of Scientists. On 19th May

1901 all the great scientists of London had assembled to witness Bose's experiment to prove that plants have life. When the plant did not die as expected after he had injected it with poison, Bose was unperturbed. He simply said, 'The poison did not kill the plant. So, it should not kill me, another living being'. So, just to make sure, he brought the injected syringe close to his left arm to inject its contents to his own body. At that moment, a man got up from his seat 'I apologise. I accept my defeat Mr. Bose. It was myself who had replaced the vial of poison with colored water.' Needless to say that the experiment was successful the second time. "(MurtyMandala)

A research scholar, V. A. Shepherd observed in his article, "At the Roots of Plant Neurobiology: A

Brief History of the Biophysical Research of J. C. Bose":

"Sir J. C. Bose (1858-1937) is perhaps best known for his ingenuity and perspicacity in the field of microwave physics. Many of his inventions, including the first solid state semi-conductor diode, are now devices taken for granted in contemporary microwave technology**.** Bose turned his attention to the world of plants in the early days of the twentieth century, merging the boundaries of what had been quite separate disciplines, botany and physics, and establishing a nascent field of biophysics. The series of insightful experiments into life-processes of plants he began then would occupy him until his death, produce a prodigious body of published work, and see him transformed from a well-respected physicist into a

controversial figure, a maverick, in the West. Seeking unifying principals underlying apparent disparities between animal and plant responses, Bose invented original and ingenious instruments that enabled him to simultaneously measure bioelectric potentials and to quantify very small movements in plants. Bose worked with touch-sensitive plants, including Mimosa pudica with plants that perform spontaneous movements, such as the Indian telegraph plant Desmodium (Codariocalyx motorius - formerly Desmodium gyrans. These guys constantly move their leaves searching for the best light. It's quick enough to watch directly but this was shot with an interval of two seconds on the D31007), as well as with 'ordinary' plants that made no obvious rapid movements. The conclusions he drew from his experiments flew in the face of the emerging Victorian mechanistic materialist philosophy of science. Plants and animals share essentially similar fundamental physiological mechanisms. As do animals, plants co-ordinate their movements and responses to the world through electrical signaling. Rather than belonging to the category of passive automata, to which they had been consigned, Bose argued that plants are sensate, active, intelligent explorers of the world. He identified a fundamental physiological motif that interlinked measured pulsations or oscillations in cellular electric potentials with oscillations in cell turgor pressure, cellular contractility, and growth. All plants respond to the world and to other living things through this pulsatile motif, this electromechanical pulse. Bose's conclusions that all plants possess a nervous system, a form of intelligence, and a capacity for remembering and learning, was poorly received by prominent electrophysiologists of the time. One hundred and fifty years after Bose's birth, concepts of kin-recognition, complex foraging strategies, intelligence, learning, and long-distance electrical signaling in plants are featured in the mainstream literature. Recent advances in both neurobiology and plant cell biology are uncovering some surprising similarities between plant cells and the neurons of animals. A relatively new discipline, plant neurobiology, now recognises plants as

knowledge-accumulating systems that enact many of the same behaviours as do animals, despite lacking eyes, ears, or an obvious brain. Plant neurobiology now aims to understand how plants perceive, remember and process their experiences, coordinating their behaviours via integrated information networks, including molecular, chemical, and electrical levels of signaling." 2

"Dr. Bose showed that there is no physiological response given by the most highly organised animal tissue that is not also to be met with in the plant. He carried on "Researches on Diurnal Sleep" and showed that the plant is not equally sensitive to an external stimulus during day and night, and that there is a fundamental identity of life-reaction in plant and animal, as seen in a similar periodic [Pg 30] insensibility in both, corresponding to what we call *sleep*. He also showed that the passage of life in the plant, as in the animal, is marked by an unmistakable spasm. He invented, an instrument (Morograph) with which he recorded the critical point of death of a plant with great exactness. He demonstrated, in the most conclusive manner, that there is an essential unity of physiological effects of drugs on plant and animal tissues and showed the modifications which are introduced into these effects by the factor of individual 'constitution.' It may be mentioned casually that "this physiological identity in the effect of drugs is regarded by leading physicians as of great significance in the scientific advance of Medicine; since we have a means of testing the effect of drugs under conditions far simpler than those presented by the patient, far subtler too, as well as more humane than those of experiments on animals.19

"Dr. Bose further demonstrated that there is conduction of the excitatory impulse in the plant, like the nervous impulse in the animal; and showed the possibility of detecting the wave in transit and measured the speed with which the excitation coursed through the plant and also showed that the velocity of excitation is modified, by different agencies, even in the case [Pg_031]of ordinary plants. He also showed that the polar effects induced by electric

currents, both in plants and animals, are identical. These remarkable researches on Plant Response have 'revolutionised in some respects and very much extended in others our knowledge of the response of plants to stimulus.'" (Speeches 19-20)

"Greats from all over the world were overawed by his findings and that prompted Noble laureate

Henry Bergson to comment 'The dumb plants had by Bose's marvellous inventions been rendered the most eloquent witness of their hitherto unexpressed life story. Nature has at last been forced to yield her most jealously guarded secrets.' According to many, no other tribute that J. C. Bose received for his discoveries could match the one above; it bespeaks of one great acknowledging the knowledge of another great." 3

Paramahansa Yogananda once entered the house of Sir Jagadis Chandra Bose at Kolkata and commented referring to Bose,

"Countless uses of Bose instruments will be made by future generations. The scientist seldom knows contemporaneous reward: it is enough to possess the joy of creative service

"Resonant (Resonant Cardiograph) records measure infinitesimal pulsations in plant, animal and human structure. The great botanist predicted that use of his cardiograph will lead to vivisection on plants instead of animals. . . .

"'Everything in man has been foreshadowed in the plant. Experimentation on vegetation will contribute to lessening of human suffering.'

"Years later Bose's pioneer plant findings were substantiated by other scientists. Work done in 1938 at Columbia University was reported by the New York Times as follows .

'The nitella plant thus may become a sort of Rosetta stone for deciphering the closely guarded secrets close to the very border-land of mind and matter.'" (Yogi 75-76)

What Bose discovered in plants was identified by the Mother as consciousness: "In the vegetal kingdom there is a beginning of the mental consciousness. In the animal it is different: the mental life begins to form and for them things have a meaning.

"I have noticed a first elementary psychic vibration in plant life, and truly the blossoming of a flower is the first stage of the psychic presence. The psychic individualises itself only in man; but it existed before him; only it is not the same kind of individualisation, it is more fluid and manifests as force or consciousness rather than as individuality.

"What difference is there between the human body and the body of a tree? In truth, there is none: the consciousness which animates them is identically the same." 4

No Boundary between the Living and the Non-Living

Bose revealed to Paramahansa Yogananda his research and demonstration as he had revealed to the

Royal Society, "A universal reaction seemed to bring metal, plant and animal under a common Law. They all exhibited essentially the same phenomena of fatigue and depression, with possibilities of recovery and exaltation, as well as the permanent irresponsiveness associated with death." (Yogi 70) A kind of astonishing wonder and irritability was perceptible when he declared that all living and non-living species of the world like man, animal, plant and metal are originally ONE. This declaration was perfectly in conformity with such a declaration in India's ancient scriptures, Upanishad, like "*Sarbam khalvidam Brahma*" (All this is Brahman) and "*Ekam evadvitiam*" (One without a second). This seemed to the scientists of the West as something bizarre. The Western scientific world became ready to confront him with bolstering bullets of questions during his lecture-demonstration session. Ancient Rishis of India were seers and hearers of Truth; to them what they uttered were Truths as emanating from the divine source coming to them through hearing and vision. Bose

too was a seer like his forefathers but his utterances weren't accepted by his modern skeptic audiences. He was equipped with scientific proofs to prove the Truth of what his forefathers uttered. Bose's flawless proof for every hypothesis silenced the critics and he was eulogized as the **Great Experimentalist** by the Press and Public. Global invitations followed from France, Germany, Sweden and Egypt. He travelled more. He declared the world as an oyster for laboratory. His Book: *Response of the Living and the Non-Living* was published in 1902.

In this connection Mother's observations and understanding about 'thousand little things' in her household for day-to-day use, meanings accessories, instruments, fixture and furniture, may give an added point of understanding about consciousness. She was an occultist, a spiritual personality. When she planned to come to India and meet Sri Aurobindo with her husband with hope of settling in Pondicherry or staying long near the Yogi who she thought to be her Guru, she became bit nostalgic towards the end of her stay at her home in Paris where she was born. In one of her Dairy Notes, published later as *Prayers and Meditations*, on 3 March 1914 she wrote, "As the days of departure draws near, I enter into a kind of self-communion; I turn with a fond solemnity towards all those thousand little nothings around us which have silently, for so many years, played their role of faithful friends; I thank them gratefully for all the charm they were able to give to the outer side of our life; I wish that if they are destined to pass into other hands than ours for any length of time, these hands may be gentle to them and know all the respect that is due to what Thy divine Love, O Lord, has brought out from the dark inconscience of chaos." 5

Consciousness is the Force that links the Living with the Non-Living

Consciousness is one which pervades the whole existence; from material to vital and mental world and beyond. This Consciousness has been identified as the Superconscient

divine Purusha. Bose's declaration that all living and non-living species of the world are originally One or his assertion that

"Everything in man has been foreshadowed in the plant" draws our attention towards a comprehensive philosophy of the scientist. We may refer to Sri Aurobindo, the exponent of consciousness for guidance.

Sri Aurobindo wrote in his Magnum Opus, *The Life Divine*, "There is a super conscient in us as well as subconscient, a range of conscious faculties and therefore an organisation of consciousness which rise high above that psychological stratum to which we give the name of mentality. And since the subliminal self in us thus rises in superconscience above mentality, may it not sink in subconscience below mentality? Are there not in us and in the world forms of consciousness which are sub-mental, to which we can give the name of vital and physical consciousness? If so, we must suppose in the plant and the metal also a force to which we can give the name of consciousness although it is not the human or animal mentality for which we have hereto preserved the monopoly of that description . . . .

"The seeking and shrinking of the plant, its pleasure and pain, its sleep and its wakefulness and all that strange life whose truth an Indian scientist has brought to light by rigidly scientific methods, are all movements of consciousness, but, as far as we can see, not of mentality. There is then a sub-mental, a vital consciousness which has precisely the same initial reactions as the mental but, is different in the constitution of its self-experience, even as that which superconscient is in the constitution of its selfexperience different from the mental being . . . .

"The development of recent research and thought seems to point to a sort of obscure beginning of life and perhaps a sort of inert or suppressed consciousness in the metal and in the earth and in other 'inanimate' forms, or at least the first stuff of what becomes conscious in us may be there. Only while in the plant we can dimly recognize and conceive the thing

that I have called vital consciousness, the consciousness of Matter, the inert form, is difficult indeed for us to understand or imagine, and what we find it difficult to understand or imagine we consider it our right to deny. Nevertheless, when one has pursued consciousness so far into the depths, it becomes incredible that there should be this sudden gulf in Nature. Thought has a right to suppose a unity where that unity is confessed by all other classes of phenomena and in one class only, not denied but more concealed that in others. And if we suppose the unity to be unbroken, we then arrive at the existence of consciousness in all forms of the Force which is at work in the world. Even if there is no conscient or superconscient Purusha inhabiting all forms, yet is there in those forms a conscious force of being of which even their outer parts overtly or inertly partake.

"Necessarily, in such a view, the word consciousness changes its meaning. It is no longer synonymous with mentality but indicates a self-aware force of existence of which mentality is a middle term; below mentality it sinks into vital and material movements which are for us subconscient; above it rises into the supramental which is for us the superconscient. But in all it is one and the same thing organising itself differently. This is, once more, the Indian conception of Chit which, as energy, creates the worlds. Essentially, we arrive at the unity which materialistic Science perceives from the other end when it asserts that Mind cannot be another force than Matter, but must be merely development and outcome of material energy. Indian thought at its deepest affirms on the other hand that Mind and Matter are rather different grades of the same energy, different organisation of one conscious Force of Existence." (Divine 86-88)

We could not have avoided this long quotation to understand what he meant by the word "Consciousness" for none else has defined it in the logical way that he did as a realised Yogi. From this long quotation from Sri Aurobindo we find that he calls consciousness , "A self-aware force of existence." By referring to it as "Superconscient Purusha" he means

“Consciousness” as God himself. But for the sake of argument with the practical and materialistic modern men he does not assert it but comes to a logical conclusion that it is a Force which in Indian conception is Chit, a part of our being. A familiar argument of SriAurobindo is that nothing can come out of something if it was not already there in any form. To emphasise that matter too bears the self conscious force of existence in it he asserts that, “Nothing can evolve out of Matter which is not therein already contained.” (Divine 87)

When Bose moved with rapid strides in multidirectional streams like entering into Artificial Retinae (Optics/ Photography), ascertaining that we see only one-fourth light, balance remaining unseen as Invisible Light or into psychological findings, he was seen as an enigma by his adversaries who were already warned and alert. In spite of his gaining international honours and accolades he received quite few negative brandings like “Oriental Magician”, “Outsider”, “Borderline Scientist”, “Marginal Man” or a “Flawed Genius”. Science historians, chroniclers started to bypass him. Scientists could not digest his references to ancient Indian wisdom and philosophy. At the same time he refused many teaching and research offers in England.

While he was being ridiculed by his own class, zealous scientists and others as they could not believe him, could not place him at par with them, Jagadis Chandra Bose went on demonstrating in countries beyond England and Europe. When he demonstrated and lectured at Sorbonne, Paris in 1996 savants there highly applauded the investigations of the Indian Professor." M. Cornu, President of the Academy of Science, was pleased to address Professor Bose as follows:

"By your discoveries you have greatly furthered the cause of Science. You must try to revive the grand traditions of your race which bore aloft the torch light of art and science and was the leader of civilization two thousand years ago. We, in France applaud you." (Speeches 9-10)

The Government of India sent him to England for six months on a lecture tour. “When Bose was in Paris in 1927 he was the guest of Romain Rolland, the world famous philosopher. Romain Rolland gave him a copy of his novel ‘Jean Christophe’ as a reminder of their memorable meeting. In it he wrote ‘To one who has shown a new world’. In England, George Bernard Shaw presented him a collection of his writings in which he wrote ‘From the least botanist to the greatest living botanist.’” (MurtyMandala) “What all these savants appreciated most was Bose's attempt to prove the age-old humanist faith in the basic unity of all life. A British editor once wrote: "In Sir Jagadish the culture of 30 centuries has blossomed into a scientific brain of an order which we cannot duplicate in the West." 6 **His Greatness was Unanimous**

Once Parahamsa Yogananda, the Yogi, visited Bose’s home laboratory. During their conversations Bose referred to his demonstration and findings on metal and said, “I announced my results before the Royal

Society- results demonstrated by experiments. But the physiologists present advised me to confine myself to physical investigation, in which my success had been assured, rather than encroach on their preserves.” (Yogi 70)

The scientist added, “I had unwittingly strayed into the domain of an unfamiliar caste system and so offended its etiquette.

“An unconscious theological bias was also present, which confounds ignorance with faith. It is often forgotten that He who surrounded us with this ever-evolving mystery of creation has also implanted in us the desire to question and understand . . . .

“In time the leading scientific societies of the world accepted my theories and results, and recognized the importance of Indian contribution to science.” (Yogi 70-71) Here the scientist refers to a subject which is usually a preserve of Indians: India is blamed for their caste-ism throughout the world. It is well known that Great Scientists and other seers and

Adventurers with futuristic visions were persecuted by their incredulous and zealous contemporaries, sometimes executed for the truth they wanted to reveal: Jesus was crucified, Copernicus and Galileo were extremely tortured and Socrates died of poisoning. Bose was performing in the modern age, at least not in so dark period of history, but he too suffered from racial discrimination and Imperialist-Colonial relationship. As in earlier times, here too truth prevailed ultimately; honesty and truthfulness won in the long run. At times the persecutors were compelled by the force of honesty and innocence to declare their mischievousness while facing the truth. "In 1927, Calcutta University honored Bose with a Hon. D.sc. degree and in the same year he was elected the President of the Indian Science Congress. In 1931 the Calcutta Municipality honored him in a function presided over by Subash Chandra Bose. Subhash Babu paid eloquent tributes to the scientific research work done by Bose. As an expression of love and respect of the people of India in general,

Jagadish Chandra Bose was honored with the title Acharya' on that memorable occasion." (MurtyMandala)

Sir Jagadis Chandra Bose was a perfect representative of the Soul of India. He was a scientist yet not materialist. He often transcended the borders of science and coordinated his vision of the beyond with the practical scientific world. It has been said that he was much ahead of his time. He would often conceive the future which links both being and non-being, Matter and the Divine. He was a Philosopher-

Scientist. Although he did not use the term 'Consciousness' his inventions and assertions were clear enough to identify the element of consciousness in them as defined by Sri Aurobindo and practised by the Mother.

Sri Aurobindo idefines consciousness as it activates life in its innumerable forms. How consciousness is present in every atom in its pristine form and how life releases consciousness out of its imprisonment. How life and consciousness act upon each other.

"In the very atom there is a subconscious will and desire which must also be present in all atomic aggregates because they are present in the Force which constitutes the atom. That force is Chit-shakti, form of conscious being, variously represented in forms of life.

Life is an energising of conscious being in substance of Matter, which on one side is constantly supplying the material of physical formation and on the other is labuoring to release mind and sense from their subconscious sleep in Matter. To create form and evolve consciousness out of its imprisonment in form is the sense of the omnipresent Life in the universe." 7

J. C. Bose the Scientist proved that there is life in plants and metals like in man and animal, thereby signifying that both beings and non-beings were linked by Consciousness.

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