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THE CONTRIBUTIONS OF JAGADĀNANDA ROY (1869-1933) TO SCIENCE POPULARIZATION IN BENGAL

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Jagadananda Roy was one of the greatest science communicators of the 20th century, whose popular science books are still appreciated by children in Bengal, even after more than 90 years of his death, due to their lucid and interesting style of presentation. Born in a landed gentry family in Krishnanagar, Nadia, Bengal in 1869, Roy was educated in Krishnanagar and was teaching in a local missionary school, when he met Rabindranath Tagore in connection with his writings in Sādhanā Patrikā. Tagore spotted the talent in Jagadananda and first appointed him in the family estate in Silaidaha, then as the private tutor of his children and finally, as the science and mathematics teacher of the Santiniketan school. Jagadananda taught here for about three decades and inspired generations of students to learn and embrace science as a passion and a profession. Inspired by his idol Ramendrasundar Tribedi, a legendary science communicator of Bengal, Jagadananda started writing popular science articles in Bengali in various magazines with the aim of popularizing science among children and creating a science awareness, scientific temper and inquisitiveness among them. The articles were then compiled into books; notable among his books were Vijñānacārya Jagadīścandrer Āviskār, Vaijñānikī, Prākṛtikī, Graha-Nakṣatra, Pokā Mākaḍ, Māch-Byāng-Sāp, Śabda, Bānglār Pākhī, Cumbak, Cala Vidyut, Nakṣatra Cena etc., which are still equally popular as they were 100 years ago. His articles were devoid of technical details and scientific jargons but provided immense pleasure to his readers. He transformed science articles into science literature that touched the mind and heart of children, whom he loved so much. He not only wrote science, but encouraged experimentation in science, nature study and sky watching in the Santiniketan school. Jagadananda was one of the early amateur astronomers in Bengal. He also wrote the first science fiction in Bengali. Hailed as the 'Science Guru' of Santiniketan, he left an indelible mark on the canvas of science communication in Bengal and reaffirmed that effective science communication is possible through vernacular. Jagadananda Roy died in 1933 in Santiniketan.

Introduction

An all-pervasive social transformation and a change in public mind-set in Bengal, resulting from the spread of Western Education, Social Reform, Women's Liberation Movement, infusion of Western Social, Cultural and Political ideas and revival of Bengali Literature that took place during the 19th and early 20th century, is generally referred to as the 'Bengal Renaissance'. But scholars have largely overlooked the role of Science and Science Communication to this enlightenment movement, particularly the contribution of scientists and science enthusiasts in this regard. The Bengal Renaissance ushered in a cult of rationality, science education and scientific temper, thereby, resulting in an appropriation of the Modern Science by the Bengali middle class in the Colonial India. Intellectuals like Raja Rammohan Roy, Iswarchandra Vidyasagar, Akshay Kumar Dutta, Rajendralal Mitra, Nawab Abdool Luteef, Bhudeb Mukhopadhyay, Umesh Chandra

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Dutta, Mahendralal Sircar and others responded in their own way to the emerging discourses of Science and Modernity in Bengal. Even Bankimchandra Chattopadhyay and Rabindranath Tagore were not indifferent to such discourses and assumed a significant role in moulding this culture of science and rationality. Scientists like JC Bose, PC Ray and Chunilal Bose contributed significantly to the science popularization in Bengal through their writings. In the early 20th century, Ramendrasundar Tribedi, Sukumar Ray, Jagadananda Roy, Charuchandra Bhattacharya and others nurtured this tradition further. Jagadananda Roy's name is particularly important in this discussion as his popular science books and science-fiction stories are still immensely popular among inquisitive children of Bengal.

Jagadananda Roy: Early Life

Jagadananda Roy was born on the 18th of September 1869 in an aristocratic Bengali Brahmin family (the original surname of the family was Mukherjee) of Krishnanagar in the Nadia district of Bengal. His father was Abhayananda Roy and mother was Basantasundari. The family was also related to the Royal family of Krishnanagar (of Maharaja Krishnachandra Roy). Jagadananda was sickly since his childhood. On completing his studies in a local school, he passed FA examination in 1890 and on passing BA examination in 1892, he started teaching in St. George High School (a missionary school in Krishnanagar). During this time, he met Rabindranath Tagore. As Tagore recounts, *'…I was writing in and editing Sādhanā (magazine) when I met him (Jagadananda). The readers of Sādhanā often used to send science enquiries. In reply to them, I used to receive replies in simple and lucid language with remarkable clarity which was very difficult to write on a scientific topic. He used to send them in the name of his wife, but I had a suspicion (that someone very conversant in science was the writer). When I finally met him, he was ailing and neck deep into poverty….'*.

Fig. 1: A Sketch of Jagadananda Roy by Acharya Nandalal Bose (Source: Visva Bharati)

Tagore made no mistake in identifying the gem in Jagadananda and offered him a job at his estate (as Nayeb) in Shilaidaha (now in Bangladesh). Soon, Tagore realized that Jagadananda was a scholarly and academically inclined man and that such a job was not appropriate for someone of his calibre. He deserved a much better position. In 1901, when Tagore established Brahmacaryāśram school in Santiniketan, he appointed Jagadananda as a teacher of mathematics. Jagadananda also taught science. The school started (at the site of the present-day Pāṭha Bhavana hall) with five students including Rathindranath Tagore (Rabindranath's eldest son) and two teachers including Jagadananda Roy.

In 1910, Jagadananda became the first Sarvādhyakṣa (Principal) of the school and remained in the post for two terms. In 1921, when Visva Bharati was established, he was elected as the first acting secretary of Visva Bharati as well as secretary of Santiniketan. Later, he assumed many other responsibilities in Santiniketan. He took up the operations of 'Santiniketan' magazine and Santiniketan printing press. He was the first president of Visva Bharati Co-operative Board. In Rathindranath's absence, he also officiated as joint secretary of Sriniketan.

As a Science Teacher in Santiniketan

In 1901, when Jagadananda first came to Santiniketan and Brahmacaryāśram was yet to start, he was assigned the responsibility of teaching Rathindranath, who was preparing for the Entrance examination. In his 'Smṛti-My memories', Jagadananda writes, *'I was teaching mathematics to Rathindranath, and I used Huxley's science book, which was a textbook for the Entrance examination, to teach him science'*. Jagadananda further acknowledged that he was initially lecturing in English, but Tagore noticed his mistakes in English and advised him to teach in Bengali. Following this advice, Jagadananda started lecturing in Bengali. Soon he realized that teaching in mother tongue is possible to impart good education with little effort.

Jagadananda Roy had a long association with Santiniketan as a teacher that continued for more than three decades. His role as an ideal science teacher became a part of the legend with his inspiring teaching and fatherly care for the young children of Santiniketan school that moulded the career and character of generations of students.

Jagadananda taught science and mathematics. He would get immersed in the subjects when he taught. His teaching was not in one-way, chalk-and-talk style; rather he used an interactive method. To dispel the fear of science and mathematics from the minds of his students, he used a story-telling approach, with lectures interspersed with historical anecdotes. His teaching was not limited to syllabus, rather it was open ended, and it opened a whole new world of learning for his students. He was ready to answer any question from the students to satisfy their inquisitiveness. Tagore wrote, *'His treasure-trove of science was always open to the students, though it was not in their syllabus'*.

Jagadananda developed a small science laboratory in the school. He supplemented his lectures with fascinating experiments that mesmerized his students. In the Annual Report of the Ashram for 1319 Bengali Era (BE), Jagadananda reported, *'There is a small laboratory in the Ashram. Some preliminary experiments can be performed there. It has a few equipment and materials for experiments in Physics and Chemistry. Apart from this, there is a Telescope, a Microscope and a Spectroscope'*. Though Jagadananda was not satisfied with this laboratory, he was able to instil a science awareness and an inquisitiveness about science in the minds of young children. Rathindranath, in his 'Pitṛsmṛti- As I remember my Father' wrote, *'Our greatest joy was the science classes of Jagadananda babu……he had an excellent ability to teach science in the guise of stories. When he used to perform experiments with instruments, we used to look at spell bound……We used to ask several silly questions, but he patiently answered all of them.'*

Even after the classes were over, Jagadananda was available to the students for discussion. In the evenings, students flocked to him. Here he answered all their queries. Here, during these evening classes, Jagadananda renewed his interest in sky watching. Rathindranath recounts, *'When father learnt that someone in Hooghly was making telescopes, he bought one (for Jagadananda babu) at a cost of Rs. 300 (a princely amount then). The instrument became very handy for him. He started watching celestial objects through it. Whenever there appeared an interesting object in the sky, he used to call all of us and showed it.'* It is said that Jagadananda showed Halley's Comet to fellow teachers and students with this 3-inch (diameter of the lens) telescope. Jagadananda also discovered a few important meteor showers. In an article titled 'Search for meteors from the Pons-Winnecke Radiant' published in Nature in 1921, the author reported that, *'R. G. Chandra of Jessore, India, also reports a fruitless search for meteors in the night of June 25. He states that Prof. Ray of Bolpur saw two meteors radiating from the neighbourhood of θ Bootes'*. Here, RG Chandra is Radha Gobindo Chandra and Prof. Ray means Jagadananda Roy. Based on his experience in sky watching, in 1915, he wrote a book titled 'Graha-Nakṣatra' (Planets and Stars). Many years later, he wrote another book titled Nakṣatra Cena (How to identify stars, 1931).

Fig. 2: Jagadananda Roy (Source: Wikipedia)

During this time, Jagadananda developed a love for nature and inspired his students to observe and study nature. He himself collected several biological samples and kept them in bottles and jars for classroom demonstration. The observations by students were regularly published in the issues of Tattvabodhinī Patrikā of BE 1318, 1319 and 1320 which were edited by Tagore. Later he wrote several books like Bānglār Pākhī (Birds of Bengal), Pokā Mākaḍ (Insects), Mâch, Byāng, Sāp (Fishes, Frogs and Snakes) and numerous other topics which helped children familiarise with the world of nature.

Towards the end of his career, Jagadananda taught only mathematics. Many students could not cope up with the difficulty of the subject, and it pained him. But Jagadananda tried hard to make his students love mathematics. He often became upset with their failure and even became rude but never gave up. Such was his commitment. A passionate and dedicated teacher, Jagadananda Roy taught continuously till his retirement in 1932, but continued to teach Mathematics voluntarily even after his retirement.

Popular Science Writings of Jagadananda Roy

Since his early age, Jagadananda Roy started writing popular science articles in Bengali literary magazines like Tattvabodhinī Patrikā, Baṅgadarśan (Navaparyāy), Bhāratī, Pravāsī, Sāhitya, Mānasī, etc. Later, these articles were compiled into books. Jagadananda Roy thus wrote 18 popular science books in Bengali. They are Prakṛti Paricay (An introduction to Nature, 1318 BE), Vijñānacārya Jagadīścandrer Āviskār (Discoveries of Scientist Jagadish Chandra, 1319 BE), Vaijñānikī (On Science, 1320 BE), Prākṛitikī (On Nature,1914), Graha-Nakṣatra (Planets and Stars, 1915), Pokā Mākaḍ (Insects, 1326 BE), Vijñārer Galpa (Stories on Science, 1920), Gāch-pālā (Trees and plants, 1921), Māch, Byāng, Sāp (Fishes, Frogs and Snakes, 1923), Pākhī (Birds, 1331 BE), Śabda (Sound, 1331 BE), Bānglār Pākhī (Birds of Bengal, 1924), Ālo (Light, 1333 BE), Tāp (Heat, 1335 BE), Cumbak (Magnets, 1335 BE), Sthir Vidyut (Static Electricity, 1928), Cala Vidyut (Current Electricity, 1336 BE), and Nakṣatra Cena (How to identify stars, 1931). Prakṛti Paricay was published by Atul Library, Dhaka. Rest of the books were published either by Indian Press, Allahabad or Indian Publishing House, Kolkata. Jagadananda also wrote two textbooks for school children e.g. Vijñān Paricay (1925) and Vijñān Praveś (1925). In addition, he wrote two books titled Paryavekṣan Śikṣā (Techniques of scientific observations) and Ādarśa Swāsthyapāṭh (An Introduction to Hygeine, a teachers' handbook) respectively. The latter was published from Ashutosh Library, Kolkata. Another book, 'Chuṭir Boi' (A Reader for Holidays, BE 1329, 2nd ed.) was a simple science book for children. Jagadananda Roy's books were illustrated by renowned artists like Nandalal Bose, Asitkumar Haldar, Binodbehari Mukherji and others.


গ্রহ-নক্ষত্র

শ্রীজগদানন্দ রায়-প্রণীত

প্রকাশক
ইণ্ডিয়ান্ প্রেস্
এলাহাবাদ
১৯১৫

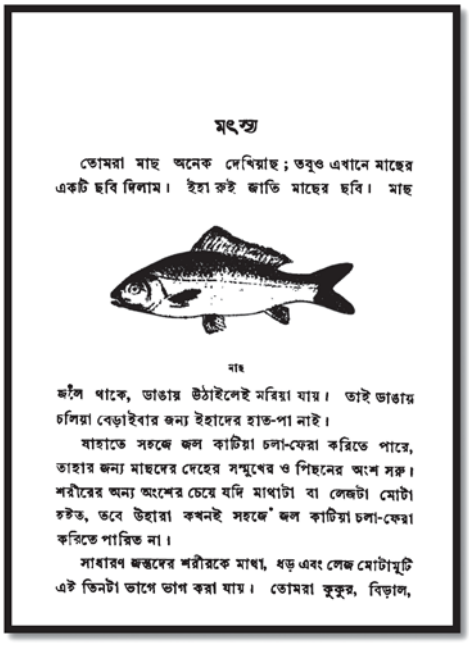
[সর্ব্ব স্বত্ব রক্ষিত] [মূল্য ১।০ এক টাকা চারি আনা]

Fig. 3: Title page of Jagadananda's book 'Graha-Nakṣatra' (Planets and Stars, 1915)

His first book Prakṛti Paricay (An introduction to Nature, 1318 BE) is a collection of 25 articles published in Tattvabodhinî Patrikâ, Baṅgadarśan (Navaparyây), Pravâsî etc. Different aspects of nature have been discussed here, but articles on physics and astronomy covered the most part like Origin of Electricity, Constituents of Matter, Light Pressure, Magnetic Storm, Carbon dioxide in Atmosphere, Halley's Comet, Birth of a Star etc. Interesting topics like 'In Search of New Planets' or 'Binary Stars' are surprise inclusion in this book. The articles are not in-depth but written in an attractive style with a lucid language. Use of analogy in explaining complicated scientific topics made the articles attractive to the children.

In the next three books e.g. Vijñānacārya Jagadīścandrer Āviskār (Discoveries of Scientist Jagadis Chandra, 1319 BE), Vaijñānikī (On Science, 1320 BE) and Prakṛtikī (On Nature,1914), Jagadananda used Science-historical approach. Vijñānacārya Jagadīścandrer Āviskār, again a collection of articles published in various periodicals, is divided into four parts: Electromagnetic Waves (preceded by a short biography of Sir Jagadis Chandra in 12 pages), Animals & Plants, Living & Non-Living and Physiology of Plants. The book does not discuss the scientific works of Sir J C Bose in detail but gives a broad idea of his works. Prākṛitikī had 32 articles on Physics, Chemistry, Life Sciences and Astronomy. There was one article on Earthquake also. But its greatest attractions were biography of scientist Lord Kelvin, and works of William Crookes, Doppler and others. Their scientific works have been lucidly discussed in the articles. The book had a second edition in 1923. Considering that the book was originally written in 1914, the topics and their discussions were remarkably up to date. Vaijñānikī contained 24 articles on Life Sciences, Geology, Physics, Chemistry and Astronomy. While the articles on Life Sciences are somewhat philosophical, such as, a transitional state between life and death, the articles on Geology are in depth and are divided into three sections, such as, Ancient Geology, Modern Geology and the Earth's Interior. The articles on Physics and Astronomy discussed topics like Electron, Light Pressure and Internal composition of Stars etc. The articles show that Jagadananda Roy was fully aware of the latest developments in science. In 1920, Jagadananda Roy's Vijñârer Galpa was published. The book was specifically meant for children and had articles on the Sun, heat from the Sun, origin of light and sound etc. It also had a few articles on Life Sciences.

Jagadananda wrote two books on Astronomy, namely, Graha-Nakṣatra (1915) and Nakṣatra Cena (1931). Jagadananda had a special fascination for sky watching. In the preface of Nakṣatra Cena, he wrote, *'I remember that when I was very young, I got fascinated with stars and planets in the sky. In the dark nights, I watched them in an open field and sometimes, throughout the night. It was an immense pleasure when I could identify the stars and constellations……A small star chart in English and a lantern were my companions during these night sky explorations…'*. In 48 articles of Graha-Nakṣatra, the author discussed our Earth, the Sun, the Moon, Planets and Satellites of our Solar System (up to Uranus- Pluto was not known at that time), Comets, Meteorites, Stars, Nebulae etc. in a lucid language with interesting analogies. The last article discussed ancient Indian Astronomy including asterisms and zodiacs. In Nakṣatra Cena, the author introduced various Stars and Constellations with diagrams. Various mythological stories on constellations were also mentioned. Jagadananda Roy is often considered as one of the earliest amateur astronomers in Bengal.



মৎস্য

তোমরা মাছ অনেক দেখিয়াছ ; তবুও এখানে মাছের একটি ছবি দিলাম। ইহা রুই জাতি মাছের ছবি। মাছ

নাং

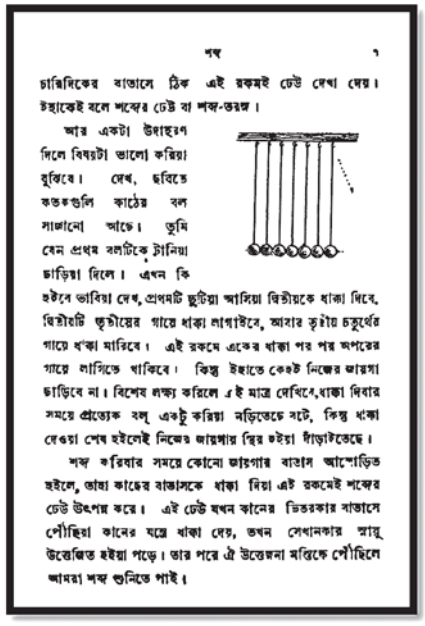
জলে থাকে, ডাঙায় উঠাইলেই মরিয়া যায়। তাই ডাঙায় চলিয়া বেড়াইবার জন্য ইহাদের হাত-পা নাই।

যাহাতে সহজে জল কাটিয়া চলা-ফেরা করিতে পারে, তাহার জন্য মাছদের দেহের সম্মুখের ও পিছনের অংশ সরু। শরীরের অন্য অংশের চেয়ে যদি মাথাটা বা লেজটা মোটা হইত, তবে উহারা কখনই সহজে জল কাটিয়া চলা-ফেরা করিতে পারিত না।

সাধারণ জন্তুদের শরীরকে মাথা, ধড় এবং লেজ মোটামুটি এই তিনটা ভাগে ভাগ করা যায়। তোমরা কুকুর, বিড়াল,

Fig. 4: A page from Māch, Byāng, Sāp (Fishes, Frogs and Snakes, 1923)

Jagadananda Roy's books on Life Sciences, such as, Pokā Mākaḍ (1326 BE), Gāch-pālā (1921), Māch, Byāng, Sāp (1923), Pākhī (1331 BE) and Bānglār Pākhī (1331 BE/ 1924) were also written for children. In Pokā Mākaḍ, the author has discussed the general descriptions of common insects and their reproduction. Interestingly, from the common sense of a science teacher, the author classified insects into seven groups depending on their physical features, behaviours and habitats etc. The book also discusses the physiology of insects, snails and prawns. Gāch-pālā discussed topics such as roots, trunks, branches, leaves and growth of trees. The book also has some interesting topics such as 'How does a plant sleep', 'Insectivorous plants', 'Mushrooms' etc. However, its discussions on botany in ancient India appears to be incomplete due to lack of sufficient information. In Māch, Byāng, Sāp, the author not only discussed the life cycles of fishes, frogs and snakes, but also discussed crocodiles, tortoises and lizards. Their physiology has been compared to that of humans. To keep the discussion simple, the author restricted it to the commonly known reptiles and fishes. Pâkhî is a well written book. Here, the author discussed the place of birds in animal kingdom, their physical features, life cycles, senses etc. The article on nest-building is very interesting. Jagadananda Roy's Bānglār Pākhī is the best among his books on Life Sciences. In this book, he has vividly discussed common birds of Bengal, their habitat, physical features and nature etc. Most often, he has indicated the local names of birds.



শব্দ ৭

চারিদিকের বাতাসে ঠিক এই রকমই ঢেউ দেখা দেয়। উহাকেই বলে শব্দের ঢেউ বা শব্দ-তরঙ্গ।

আর একটা উদাহরণ দিলে বিষয়টা ভালো করিয়া বুঝিবে। দেখ, ছবিতে কতকগুলি কাঠের বল সাজানো আছে। তুমি যেন প্রথম বলটিকে টানিয়া ছাড়িয়া দিলে। এখন কি হইবে ভাবিয়া দেখ, প্রথমটি ছুটিয়া আসিয়া দ্বিতীয়কে ধাক্কা দিবে, দ্বিতীয়টি তৃতীয়ের গায়ে ধাক্কা লাগাইবে, আবার তৃতীয় চতুর্থের গায়ে ধাক্কা মারিবে। এই রকমে একের ধাক্কা পর পর অপরের গায়ে লাগিতে থাকিবে। কিন্তু ইহাতে কেহই নিজের জায়গা ছাড়িবে না। বিশেষ লক্ষ্য করিলে এই মাত্র দেখিবে, ধাক্কা দিবার সময়ে প্রত্যেক বল্ একটু করিয়া নড়িতেছে বটে, কিন্তু ধাক্কা দেওয়া শেষ হইলেই নিজের জায়গায় স্থির হইয়া দাঁড়াইতেছে।

শব্দ করিবার সময়ে কোনো জায়গার বাতাস আলোড়িত হইলে, তাহা কাছের বাতাসকে ধাক্কা দিয়া এই রকমেই শব্দের ঢেউ উৎপন্ন করে। এই ঢেউ যখন কানের ভিতরকার বাতাসে পৌঁছিয়া কানের যন্ত্রে ধাক্কা দেয়, তখন সেখানকার স্নায়ু উত্তেজিত হইয়া পড়ে। তার পরে ঐ উত্তেজনা মস্তিষ্কে পৌঁছিলে আমরা শব্দ শুনিতে পাই।

Fig. 5: A page from Śabda (Sound, 1331 BE)

Among the popular science books of Jagadananda Roy, the books on Physics are perhaps the best. Though we find many articles on various topics of physics in his other books, Jagadananda wrote six books on specific branches of physics, e.g., Śabda (Sound, 1331 BE), Ālo (Light, 1333 BE/1926), Tâp (Heat, 1335 BE/1928), Cumbak (Magnets, 1335 BE/1928), Sthir Vidyut (Static Electricity, 1928) and Cala Vidyut (Current Electricity, 1336 BE/1929). Jagadananda Roy may be called the pioneer of popular Physics writings in Bengali. Before Jagadananda's books

were published, Chunilal Bose had written a book on Light and Nalini Nath Roy had written another on Magnetism; but their endeavours were limited to a single book each. The book Śabda (Sound, 1331 BE) has 24 articles. Here, the author has discussed sound waves, their propagation, frequency, wavelength, intensity, vibration of strings, echo, interference of sound waves, Doppler's effect, noise and melodious sounds, various kinds of musical instruments, our vocal cord, phonograph etc. The discussion is simple and non-technical but is fully comprehensible by children as well as by common people. To keep it simple, the author did not discuss any experiment on sound and used only day-to-day experiences. Ālo (Light, 1333 BE/1926) is more extensive and has 48 articles; but here again, the discussions are simple and non-technical. The topics include origin of light, propagation and velocity of light, intensity of light and formation of shadows, reflection of light from plain and curved mirrors, total internal reflection and mirage, interference of light, concept of colour, spectrum and its analysis, spectrometer, telescope and microscope, photography and cinematography etc. Tāp (Heat, 1335 BE/1928) was partially published in Śisusāthī magazine and was aimed at children. Its topics were rudimentary. Cumbak (Magnets, 1335 BE/1928) was also written as an enjoyable reading and contained topics such as properties of magnets, magnetic fields, making of artificial magnets, electromagnets, working of a calling bell, Earth's magnetic field, etc. Sthir Vidyut (Static Electricity, 1928) and Cala Vidyut (Current Electricity, 1336 BE/1929) were the first Bengali language books on electricity. Sthir Vidyut has 25 articles and discussed origin of electricity, positive and negative charges, electric field and lines of force, induction of charges, insulators and conductors, Lyden jar condenser, thunders and lightening, lightening arresters, electrical energy etc. Cala Vidyut has 35 articles with topics such as Voltaic piles, electric cells, batteries, flow of electricity, measurement of current and resistance, Ohm's Law, Rheostat, shunts, electrical energy, heating effect of electricity, electric lamp, electrolysis, magnetic field of current electricity, electric field, electromagnetic induction, mutual and self-induction, Ruhmkorff's coil, galvanometer, ammeter and voltmeter, dynamo and motors, transformers, telegraph, telephone and microphone, discharge of electricity through gases, electromagnetic wave, radio telegraphy, radio telephony etc.

Among his textbooks, Ādarśa Sāsthyapāṭh is worth mentioning. It is a teachers' handbook of general hygiene for class 2 students (typically of the age of 6 or 7 years). It contains all rudimentary concepts of maintaining good health and hygiene with commonplace examples. Interestingly, the author advised to teachers that the teaching should be restricted to oral mode only.

Jagadananda Roy: the Pioneer of Bengali Science Fiction

Bengali literature has a long tradition of science fiction writings. The earliest writer of science fiction in Bengali was Hemlal Dutta. His story, 'Rahasya' (The Mystery) was published in two instalments in 1882 in the pictorial magazine Vijñān Darpan. In 1896, scientist JC Bose wrote 'Niruddeśer Kāhinī', an interesting imagination on climate control. Later in 1921, it was included in his collected works as 'Palātak Tufân' (Runaway Cyclone). In 1933, famous adventure and detective story writer Hemendra Kumar Roy wrote 'Meghdūter Martye Āgaman' (When Martians Came to the Earth). It was inspired by the 1898 novel 'War of the Worlds' by HG Wells. Two years later, Hemendra Kumar translated Wells' work into Bengali. Other who wrote successful science fictions in Bengali include Begum Rokeya Sakhawat Hossain, Premendra Mitra, Adrish Bardhan, Anish Deb and of course, Satyajit Ray.

In 1892, six years before HG Wells published 'War of the Worlds', Jagadananda Roy wrote 'Śukra Bhramaṇ' (Travels to Venus). The story was later included in Prakṛtikī (1914). In this story, the author travels to the Venus in his dream and meets the semi-civilized humanoid apes of Venus. 'Śukra Bhramaṇ' was one of the earliest science fiction stories in Bengali and hence Jagadananda Roy is justly considered a Pioneer of Bengali Science Fiction.

Conclusion

After his demise, Rabindranath Tagore had written, '*Jagadananda Roy's name is already well-known to children and their parents. He introduced science in a simple and interesting manner among the children of impressionable age. We know his deep love and commitment for children and now after his death, his labour of love that he has left behind, will remain intact.*'

Inspired by the science writings of his guru Ramendrasundar Tribedi, Jagadananda Roy lifted the level of science articles to the level of science literature. Though his articles lacked the technical details of those of Ramendrasundar, they were of very pleasant reading and provided immense pleasure to his readers, particularly to children and for this reason, he was so popular as a science communicator. In recognition to his contribution to science literature, Jagadananda Roy was elected the President of the Science chapter of Bangīya Sāhitya Sammelan (Naihati, BE 1330).

All the science books of Jagadananda Roy were written in Bengali, his mother tongue. While Bengali scientists of that era wrote their original works in English, as was the prevalent practice, Jagadananda Roy's books became a wonderful demonstration of the fact that scientific treatise can be written in Bengali as well. For this, Jagadananda created unique Bengali vocabulary of scientific terms. However, he was in favour of using original German or English or Russian scientific terms wherever they are well known and meaningful; in this connection he preferred foreign vocabulary than Sanskritized Bengali. Thus, he struck a judicious balance between original scientific terms and their translated Bengali vocabulary. This is exactly what we practise even today. This vision and uniqueness made him different from everyone else. Therefore, Rabindranath had to admit finally, *'In this country, he was the first to serve the simple diet of science to the curious and inquisitive youth of the early age.'*

Jagadananda Roy wrote popular science during the golden age of science in Bengal when scientists like JC Bose, PC Ray, CV Raman, MN Saha, SN Bose, DM Bose, PC Mahalanobis, KM Krishnan, JC Ghosh, SP Agharkar, Ganesh Prasad and others were active. They inspired generations of Bengali children who were born and brought up during this period. These children were curious about science and were eager to learn and assimilate modern science. Jagadananda Roy's writings supplied them with enough food for thought. The primary objective of Jagadananda's science writings was to instil a sense of curiosity in science among the children, and he largely was successful in that endeavour. He was, thus, one of the greatest science communicators of the 20th century. ❐

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