

Scientific realities make **Binoy Barman** explore the universe

AT first glance it appears to be a work of poetry or fiction. But as one flips through the pages it becomes clear, nay, it is a book of science, on cosmology. Then, you might say, the title "Alo Hatey Chaliyachhey Andharer Jatri" (Travelers of darkness moving with light in hand) is misleading. Yes, misleading, artistically and poetically. The words in the title have been picked up from a popular song of Tagore: "Tumi Ki Keboli Chhabi, Shudhu Patey Likha" The writer Abhijit Roy recounts the tale of title discovery in prelude. Having finished writing the manuscript, when he was hunting for a title, "The Demon-Haunted World", by Carl Sagan, caught his attention on some idle noon. Its sub-title, "Science as a Cradle in the Dark", rang in his heart with some unknown musical tunes. He searched for similar meaningfully melodious expressions in Bangla when Tagore's song struck his mind. And he got his title a satisfying one, I suppose.

Is there any intrinsic relationship between the universe and music? Is there any undercurrent of tunes always flowing through the heart of nature? Maybe. The poets and musicians in deep meditation can feel that unheard rhythm and beat and transfer them to their own heart. They present those in new composition to the people on earth and soothe their mind. They are blessed. Recent science claims that the universe consists of ten dimensions. We only know four of them length, breadth, height and time, the fourth one being discovered by Albert Einstein. But we are yet to know anything about other dimensions. Scientists predict that the six other dimensions are hidden (in curled or twisted condition) at the most basic sub-atomic level. We cannot see them, feel them and even think of them. Those can only be proved theoretically, with mathematics. The theory we are here talking about is called "String Theory". It postulates the most basic particle as some infinitesimally tiny string. A string like that of musical instrument a violin or guitar, or, in the Bengali context, say, 'ektara', 'dotara', 'setar' or 'tanpura'? Do they create any symphony? You cannot hear them with human ears. The strings are always swinging and vibrating in different modes, expressing themselves through energy and matter. The String Theory is still in its developing stage; it is said to be a future scientific theory, accidentally discovered by present-day scientists.



**Alo Hatey Chaliyachhey
Andharer Jatri
Abhijit Roy
Ankur Prakashani**

"Alo Hatey Chaliyachhey Andharer Jatri" presents a rich array of scientific essays on cosmology in Bangla. The book describes the gradual development of cosmological science, from the classical period to modern times. It details the contributions of the great scientists who have dramatically changed our understanding of the universe and our existence in it. The scientists, all jewels Kepler, Copernicus, Galileo, Newton, Einstein, Hawking a constellation of

dazzling stars in the night sky. It must be remembered that some sub-continental scientists have also secured their position in the constellation. Meghnad Saha ('Saha Thermal Ionisation Theory' is named after him), Satyen Bose ('Boson'), Chandrasekhar ('Chandrasekhar Limit'), CV Raman ('Raman Effect') and Abdus Salam (famous for 'Electro-Weak Force'). The writer rightly terms them as travellers in heaven, who take out darkness with their light of knowledge. They deserve tribute in music.

The book is divided into two broad sections and into a total of fourteen chapters. The chapters are equated with phases. The first section, the main body of the book, comprises seven phases, which discuss the development of cosmological theories in chronological order and assess the contributions of great scientists. The second section holds appendices, divided into seven phases, incorporating supplementary discussions on topics discussed in the first section. The first section centres around such topics as Newton's gravitational law, Galileo's sun-centred solar system, Einstein's relativity theory, big bang and ever expanding universe, mysterious matter and force and future of the universe, string theory, and universe and God. All have been explained duly, as easily as possible, carefully avoiding technical language. The language is plain but full of wit. The writer entertains readers with his good sense of humour a rare quality for a science writer indeed. Science becomes interesting rather than boring with his pen. Let us consider what he says about Newton's discovery of gravitation after being hit by an apple in the head while the legendary scientist was sitting under a tree. The arguments presented by the writer force us to believe that the story of the falling apple on Newton's head was fabricated. It was his extraordinary genius and continuous contemplation with science that made him discover the natural law of gravitation, probably the most impor-

tant astronomical discovery in entire science history. Abhijit laments why the discovery was not made by any intelligent person in our land. Do fruits not fall from trees on anybody's head here? Yes, they do. But imagine the picture of a falling jackfruit, our national fruit, on anybody's head. What will happen? The person dies and the theory is lost!

The book has an explicit agenda of eradicating superstition from society. With creating awareness of science, it encourages readers to shun illogical beliefs and accept scientific explanations. The agenda ultimately goes against certain propositions of religion. For example, religions in general preach the idea of an earth-centric solar system and universe. But science has proved that the earth is not the centre of the solar system and universe; it is just a planet in the sky at any corner. Science has made it clear that the sun is the centre of the solar system while nine (the number was reduced to eight after Pluto was cancelled as a planet recently) planets are moving around it. Our dear earth is one of the planets of the solar system. Science had to lock horns with religion for its claims over the centuries. As religious scriptures were consistent with the theories of Aristotle and Ptolemy, the Church and other religious institutions accepted their theories in defence of their naïve suppositions. Copernicus first challenged the theories of Aristotle and Ptolemy and suggested with scientific evidence, that the earth moves around the sun and not vice versa. In the struggle to establish the truth, many scientists had to suffer pains. Giordano Bruno was burnt alive and Galileo Galilei was humiliated by the Church. The path of science has not been a bed of roses. Throughout history, science has had to fight the excesses of religion defeat the false ideas with scientific truth at the cost of blood and life.

How big is this universe? There are about forty thousand crore stars in the galaxy in which our solar system is

situated. We call our galaxy the Milky Way. There are about one hundred crore galaxies in our universe. Scientists argue that there might be many other similar or dissimilar universes beyond the circumference of our own and known universe. We on earth just feel helpless when we ponder the vastness (or limitlessness) of the universe (or universes). Are we alone in the floating vastness? Scientists argue that there might be life elsewhere, human beings, like or unlike us. The quest for life on other planets has just begun. Missions go to the moon, Mars, Jupiter and beyond. One wonders what will happen when we meet human-like beings somewhere else. Will they be friendly or hostile? Will they help us to solve the problems we face on earth or jeopardise our existence? How will religious beliefs be impacted? Will people still believe in God? We may look forward to the future for answers.

The book is a reliable guide to cosmological and partially astrophysical facts. The scientific accounts are accompanied by necessary pictures and diagrams. In Bangla science publications are really rare. "Alo Hatey Chaliyachhey Andharer Jatri" should count as a gem in the realm of popular science. The book will prove useful for science students as well as general readers with a scientific bent of mind.

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