

◎◎THE CREATIVE IMPULSE♣◎

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◎Truth and Beauty: Aesthetics and Motivations in Science. by S. Chandrasekhar.◎ Viking Press, 1991. Price Rs. 175.◎

In this age of smart bombs and supercomputers, most people have two kinds of images of scientists. One is that of an evil genius who is hellbent on destroying the world through his inventions, as immortalized by Peter Sellers in Kubrick's "Dr. Strangelove". The other image is that of an absent minded genius, who can't tie his shoelaces but ponders on the mysteries of the universe. But one common trait of both these mythical creatures is a fascination of mathematical and objective reality and a disdain for aesthetics and subjectivity. In fact, scientists are usually assumed to be philistines with no interest in matters of emotions, beauty or art.◎

Chandrasekhar's latest collection of essays, "Truth and Beauty" should rectify this popular misconception. Here is one of the greatest living astrophysicist, who is not only familiar with the world of art and music, but is also asking profound questions relating to the aesthetic basis of science and art. Delivered over a period of four decades, these seven lectures can be divided into two parts. Four essays address the general question of 'aesthetics and motivations of science', while three are on the life and work of great astrophysicists, Milne, Eddington and Schwarzschild.◎

In the opening piece on 'The Scientist' (1946), Chandrasekhar sets out by dividing the physical sciences into 'basic' and 'derived' sciences. Basic science is that which 'analyzes the ultimate constituents of matter and the basic concepts of space time' while derived science is 'concerned with the rational ordering of the multifarious natural events in terms of basic concepts'. Here he rejects the traditional division of pure and applied science since he does not believe that 'the true values of science are to be found in the conscious calculated pursuit of the applications of science'. For him, the true values of science include the universality of basic laws, the predictions based on these laws and the identifications resulting from them. Illustrating his thesis with anecdotes from history, he convincingly establishes the usefulness of this categorization.◎

Chandrasekhar then continues his explorations in the next three essays. Here he is trying to understand the aesthetics in science and the differences in the patterns of creativity of artists and scientists. In an extraordinary essay, he compares the works of three masters in their fields; Shakespeare, Beethoven and Newton. Displaying an amazing familiarity with not only their work but also with the critical work done on them, he compares their creative genius. For him, Shakespeare and Beethoven exhibited a

similarity in their creative style while Newton was very different. The essential point is that while an artist matures and grows with time, a scientist usually does not. Thus while the last works of an artist are usually his best, the most significant work of a scientist is usually his earliest. This certainly strikes one as a sweeping generalization, but Chandrasekhar gives numerous examples from the field of literature and science to make his point. Even while disagreeing with his conclusions, one is certainly impressed by his scholarship and lucidity.

The practice of science is usually associated with studying objective reality and experiment is the touchstone with which theories are tested. Considerations such as beauty and simplicity are supposed to be kept out of this field. Chandrasekhar demolishes this notion in his essay on 'Beauty and the Quest for Beauty in Science'. Quoting Heisenberg, one of the founding fathers of quantum mechanics, he defines beauty to be 'the proper conformity of parts to one another and to the whole'. Again, by using examples of great scientists like Weyl, Ramanujan and Boltzmann, Chandrasekhar contends that the criterion of beauty is very important in the practice of science. Given a choice between the true and the beautiful, many a scientist will agree with Weyl in choosing the beautiful. This might sound strange to those of us who believe in science being the quest for Truth, but it demonstrates the importance of aesthetic beauty in the endeavor of science.

The next three lectures on the lives and works of Milne, Eddington and Schwarzschild are of a different nature. Unlike the first four lectures which can be read and enjoyed by the non-specialist reader, these are technical in nature. They presume a substantial familiarity with the subject and can be appreciated fully only by the specialist. Nonetheless, they provide a rare insight into working of science. Science rarely is a sequence of successes. Even these men of extraordinary intellectual caliber had their share of false leads and pitfalls. Eddington spent the last 20 years of his life expounding his 'fundamental theory' which was a failure. Even his status as the paramount astrophysicist did not help him in convincing the scientific community. On the whole though, these essays will leave the non-specialist reader lost in their technical details.

This book is a fascinating account of one of the greatest minds of today groping with profound and deep questions. It is a mark of the tremendous intellectual stature of the author and his training as a scientist that the answers that he proposes are in the nature of hypothesis and conjectures. Nevertheless, it is an important book and must be read by those who are interested in science and its practice.

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DR. SHOBHIT MAHAJAN