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'Chandra could wrap himself up in numbers and symbols'

On the birth centenary of Nobel laureate Subramanyan Chandrasekhar (1910-95), one of the greatest cosmologists of the 20th century, ***Arthur I Miller****, former professor of history and philosophy of science at University College, London, spoke to* ***Subodh Varma****. Miller is well known for his book on Chandrasekhar,* ***Empire of the Stars:***

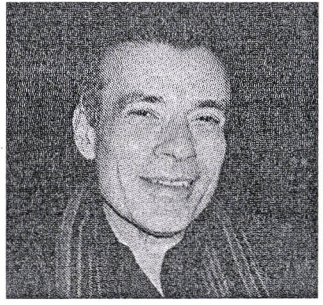
■ What are the key contributions of Chandra to cosmology?

Chandra's greatest contribution was his discovery of black holes. He found that if the mass of a white dwarf star exceeded a certain limit – which became known as the Chandrasekhar limit – then it would undergo a collapse into an infinitely dense, infinitely small point and become a black hole. Chandra made this discovery in 1930 when he was only 19 years old. This led to a furious and bitter dispute with the greatest astrophysicist of the day – Arthur Stanley Eddington. After all, how could something as big as a star collapse to nothing? Then, there was the unspoken point that a very dark-skinned Indian had made this discovery. What happened shattered the personal lives of Eddington and Chandra as well as setting back research on black holes for some 30 years.

Q&A

■ Was it difficult for an Indian scientist to work in Europe and USA then?

In the 1930s there was a great deal of discrimination in Britain against non-whites that carried over into the academic sphere with its old-boy network. The great Indian mathematician, Ramanujan, experienced this in Cambridge, as did Chandra. Discrimination followed Chandra to the United States where his very dark complexion resulted in him being mistaken for a black



person and sometimes suffering the prejudice that was rampant there, in the 1940s and 1950s.

■ What was Chandra's method of theoretical research?

Chandra extensively researched a subject, wrote up his results with incredible mathematical detail and then went on to wrap it all up with monographs, which were eagerly scooped up by astrophysicists. Equations spoke to him. He could wrap himself up in numbers and symbols like a cocoon. Chandra had the vision of the 'big picture' and the mathematical power to carry out the most complex calculations at incredible speed, with astounding accuracy. That was his genius.

■ What was he like as a person?

Chandra had the persona of a calm and caring person. But he could also be harshly critical of lecturers and even harsher on himself. With his heavy working schedule – he worked seven days a week, lecturing and writing – he often neglected his personal life. He was the quintessential loner. Chandra led a complex life, as one would expect from a complex person.

■ What were his views on beauty and creativity?

Chandra was a cultured man, well read in art and literature. He was convinced that 'one may evaluate scientific theories as works of art in the manner of literary or art criticism'. He expressed his thoughts on this subject in a fascinating essay on the relation between Claude Monet's Haystack paintings and the landscapes of general relativity – the landscape of space-time, determined by its geometry. Musing over the very complicated equations that described the collision of gravitational waves and those describing black holes, he realised in a moment of sublime insight that they were actually connected by a relatively simple looking equation. Like Monet's unchanging haystack, this equation from which both sets of equations could be deduced was, for Chandra, the unchanging object in the landscape of general relativity. Chandra put all this eloquently: 'If nature leads to mathematical forms of great simplicity and beauty – to forms that no one had previously encountered – we cannot help thinking that they are true and they reveal genuine features of nature'.