

CHANDRASEKHAR AND HIS LIMIT by G. Venkataraman, (*University Press (India) Pvt Ltd 1992*, pp viii + 135, price Rs. 35/-

G. Venkataraman is doing a signal service to Indian Science through his series of *Vignettes in Physics*, of which this book forms a member. These books are meant to present highlights of present day physics against their historical backdrops and future perspectives. As the author puts it in the Preface: "...if the reader is able to experience at least in some small measure the *excitement* of science, then my purpose would have been achieved...". Although each book selects a specific area, the author is at pains to emphasize that Nature herself knows no boundaries.

The present book is devoted to the early work of the India-born Nobel Laureate Subrahmanyam Chandrasekhar - work that has created its own niche in astrophysics, viz the structure of white dwarf stars. White dwarfs are highly dense faint but hot stars that are not so common in the vast colony of stars in the Galaxy but which represent one of the possible end states in a star's life.

The book itself comes to Chandra's (-as Chandrasekhar is commonly known) seminal work on white dwarfs towards the end - in chapter 6. The early chapters lead to it as a climax.

Thus Chapter 1 is biographical, giving a background of Chandra's early days till he went to Cambridge. There are several anecdotes : the reader may find the one about C.V. Raman's turban well worth renarrating.

There is a change of gears from chapter 2. There is a rapid narration of the biography of a star. The description here is reasonably semitechnical but suffers in places from the accent on brevity. The build-up of elements by the alpha process is scarcely touched, for example, thus leaving Figure 2.11 something of a mystery.

Chapter 3 talks of the physics of stellar interiors. The author discusses the subject as per Chandra's classic book of the late 1930s, *An Introduction to the Study of Stellar Structure*. Necessarily therefore the emphasis is more on mathematical aspects than on qualitative physical perception. This can be both strength and weakness of the description as the reader will appreciate. Following Chandra's approach chapter 4 deals with polytropic solutions and chapter 5 with quantum degeneracy effects, Fermi-Dirac and Bose Einstein statistics etc.

The most important chapter 6 (which the author earlier asks the reader to approach sequentially rather than jump to it !) contains Chandra's work on white dwarfs and the (now famous) Chandrasekhar limit. The historic events leading to the clash between Eddington and Chandra are well narrated with some physical explanation of the stands taken by the various scientists involved. Had the leading physicists of the time like Niels Bohr and Wolfgang Pauli taken public stands Chandra would have received justice much sooner than he did eventually.

Chapters 7 and 8 discuss the aftermath of the climatic events described in Chapter 7, with the former telling about the subsequent developments of highly collapsed objects in astrophysics, e.g. neutron stars and black holes and the latter describing Chandra's subsequent life story upto the present.

How successful is this exercise in describing to a lay reader in science an important astrophysical discovery by a great mind in a pedagogical fashion ? I would rate it at 80 % . The plus points are the style of presentation; the physics described, the valuable anecdotes and life sketches of famous scientists, the broad coverage of subject matter etc. Negative aspects are : (i) the boxes are not titled and hence lose focus (ii) the chatly sentences sometimes seem contrived and detract from the overall flow and (iii) omission of some scientists (e.g. Laplace who did so much work to establish the credibility of Newtonian gravity) and topics (e.g. Supernova 1987A which could have been added to the description of Chapter 7) and (iv) the absence of an index. Also, I would have made a different list for further reading.

Finally I disagree with the author's suggestion to call this series a 'Junior Feynman Series '. The series can stand on its own to be called Venkataraman Vignettes in Physics and the author deserves to be congratulated for undertaking a worthwhile task.

- J.V. Narlikar