

A superabundance of riches

Selected Papers of S. Chandrasekhar. Volume 1: Stellar structure and Stellar Atmospheres. 516 pp; Volume 2: Radiative Transfer and Negative Ion of Hydrogen. 622 pp. University of Chicago Press. 1989.

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Professor Subrahmanyan Chandrasekhar was awarded the Copley Medal of the Royal Society in 1984. In 1983 he was awarded the Nobel Prize for Physics, being thus the first purely theoretical astronomer or astrophysicist recognized in this way.

Chandrasekhar has worked in every main branch of theoretical astrophysics and astrodynamics. His practice has been to concentrate on one branch for some years and to publish a sequence of research papers in the normal way. Then he has presented his 'mature outlook' on this branch in a substantial comprehensive monograph. He has then repeated the procedure in another branch; this he has chosen evidently on grounds of topical interest and importance, and of the scope it has offered for the exercise of his remarkable mathematical skills. Having done all this several times over, between 1939 and 1983 he produced in this fashion six such monographs.

'The present volume, including papers published during the years 1929–1945, is the first of a series of five or six volumes, all hopefully to be published by 1990.' So writes Chandrasekhar in the Preface to the first volume. Volumes 1 and 2 are well-produced books of over 500 and over 600 pages. They comprise photographic facsimiles of 44 and 35 papers, respectively, as they were originally published, mainly in the years 1929–44 and 1944–50. The publishers mention specifically six volumes and state, 'A complete list of publications

by S. Chandrasekhar will appear at the end of the final volume.'

Starting from a first proposal many years ago that he should consider publishing 'a collection of his scientific papers', Chandrasekhar outlines the history of the project up to the launch of the actual undertaking signalled by the appearance of Volume 1. He naturally indicates the problem presented by the fact of so much of his work being already collected in the monographs. The solution adopted by him and his publishers is to bring out 'selected papers'. In making the selection for each volume, he is to have the advice of another eminent astrophysicist or relativist familiar with its field.

Chandrasekhar's consultant for Volume 1 has been Professor Martin Schwarzschild; he states on page xii the two criteria they adopted in selecting papers for this volume. In the nature of the exercise these have to be somewhat imprecise; also it is not clear whether they have been treated as necessary or sufficient criteria for inclusion. Until the promised complete list is available we shall not know which papers have been left out of the series. We must count upon the list showing where each included paper occurs in the series. All one can say here is that present indications lead one to expect the series, in number of volumes and of total pages, to be about the same as the monographs. So the scientific content seems likely to be about the same too, i.e. the selection effect looks like being small.

The working historian of science will surely welcome the appearance of 'papers'. However, one cannot but wonder whether the cause of the working scientist might have been better served by simply re-issuing the monographs in paperback, with a brief new foreword for each by Chandrasekhar himself, simply because of the superabundance of riches in the papers. This seems now to be idle speculation; and manifestly any fully critical review of the present project has to await its completion.

One speaks of 'completion' of this project, but one has to remark that Professor Chandrasekhar is all the time exceedingly busy creating the necessity for the next

such project.

Two brief comments may be offered on the contents of Volume 1. One is to notice that much of the work in its Part One resulted from Chandrasekhar and a few contemporary scientists seeking to take due account of the consequences in the astrophysical problems concerned of the theory of special relativity. At the time they took no account of the consequences of the theory of general relativity. About half-a-century later these have been at the root of Chandrasekhar's recent researches. But they do have significance for some of the early work as well. In retrospect it seems strange that this was not recognized at the time.

The other comment arises from the fact that this year there is being commemorated the centenary of the birth of the great mathematical physicist R. H. Fowler (1889–1944). Chandrasekhar wrote Paper 1 in the volume in 1929 in India, when he was aged 19. It was Fowler who communicated it for publication in the *Proceedings of the Royal Society*. Paper 19 in the volume is the only non-research paper; it is Chandrasekhar's obituary of Fowler in the *Astrophysical Journal* in 1945. Had there been no Fowler to act as he did in 1929, there might have been no *Selected Papers* for notice in 1989.

For Volume 2 the consultant has been Professor T. W. Mullikin, who supplies a brief informative Foreword on the history of modern work on radiative transfer. Paper 25 in that volume, pp. 511–541, 'Radiative transfer: a personal account', given in 1981 in Armenia, is Chandrasekhar's retrospective view of mainly his own work and its relationship to work done by V. A. Ambartsumian in that country. It typifies most contents of the book in that its 30 pages include 132 numbered equations, most occupying a few lines, and one an entire page. Chandrasekhar describes the time, almost 40 years earlier, when he was doing this work as 'the happiest years of my scientific life'. The outpouring of research collected in these volumes makes an ordinary mortal despair of ever becoming a professional scientist in this class.