

Adjusting the Scientific Canon to Accommodate Chandrasekhar

A Quest for Perspectives: Selected Works of S. Chandrasekhar (With Commentary)

Edited by Kameshwar C. Wali
Vols. 1 and 2. Imperial College Press, London (Distributed by World Scientific, New York), 2001. \$150 set, \$88 paper set, (1428 pp.). ISBN 1-86094-201-6 set, ISBN 1-86094-208-3 paper set

Reviewed by William H. Press

Subrahmanyan Chandrasekhar, never addressed in life as other than “Chandrasekhar” (by students) or “Chandra” (by all others), died in 1995. We are now in that twilight that follows the departure, whether through death or inactivity, of any productive figure in science, during which the scientific canon readjusts itself to a new structural equilibrium. In ordinary cases, the dominant adjustment is a loss of attribution, as the particular discoveries of the individual—freed of the discoverer’s collegial presence—are absorbed into collective scientific lore.

For a few towering figures in any scientific field, however, the process is not one of absorption, but of canonization. For which specific achievements shall the individual be forever known? And, which true or apocryphal anecdotes about the individual shall be permanently stored in that distributed organic data store of carbon-based scientist lifeforms—transferred from professor to graduate-student brain in the laboratory or over lunch?

At a minimum, Chandra’s immortality is guaranteed by his books, physically powerful and mathematically gorgeous monographs that appeared about once a decade for more than 50 years, each on a different subject in astrophysics, most of them not merely explicating but defining a subfield. Almost all are still in print, and most of them (if we believe the Amazon.com database) sell more copies

today than do the typical winners of the nonfiction Pulitzer Prize over the same period of time. For example, *Hydrodynamic and Hydromagnetic Stability* (Clarendon, 1961) sells about the same as Norman Mailer’s *Armies of the Night* (1969 Pulitzer); *Radiative Transfer* (Clarendon, 1950), *Introduction to the Study of Stellar Structure* (U. Chicago Press, 1939), and *Mathematical Theory of Black Holes* (Oxford U. Press, 1983) each outsells Theodore H. White’s *The Making of the President* (1962 Pulitzer). And so on. Incidentally, *Chandra: A Biography of S. Chandrasekhar* (U. Chicago Press, 1991) by Kameshwar C. Wali (editor of the present volumes) also sells today in numbers comparable to these.

The two fat volumes of *A Quest for Perspectives*, selected papers spanning Chandra’s whole career, with useful commentary by Wali (a physicist at Syracuse University), are thoughtful contributions to the canonization process: They memorialize facets of Chandra’s career that are different from his magisterial books. The needs of archivists and historians are already well served by the series of Chandra’s *Selected* [but fairly complete] *Papers* published by the University of Chicago Press between 1989 and 1996. Wali’s choices in these two volumes are a more selective and more interesting subset, picked as much to give a sense of the man as of the science.

Chandra’s earliest scientific period includes his collision with E. A. Milne and unwarranted and undeserved public humiliation by Arthur Eddington over the issue of the existence of an upper mass limit for white dwarf stars (which, vindicating Chandra and vanquishing Eddington, soon became known as the Chandrasekhar Mass). Wali gives us, along with Chandra’s key papers—including those that Chandra for a time suppressed rather than reengage his tormentors—a bit of the published Eddington–Milne discussion.

Chandra’s celebrated *Reviews of Modern Physics* article “Stochastic Problems in Physics and Astronomy” (1943) is included; this alone is worth the price of the volume, since Nelson Wax’s *Selected Papers on Noise and*

Stochastic Processes (Dover, 1954), which included it and was a mainstay for generations of graduate students in physics, is currently out of print.

Fascinating also are the two 1953 papers by Chandra and Enrico Fermi, the writing of which Chandra later remembered as one of the most exciting experiences of his scientific career. The names are alphabetical in both papers, but each paper reminds one of the famous horse-and-rabbit stew (one horse, one rabbit). Fermi is the horse in the first, shorter paper, but is the rabbit in the second, longer one. What a delicious contrast it is!

More than 300 pages at the end of the second volume are devoted to Chandra’s miscellaneous writings. Here, Chandra’s humanity emerges most clearly in multiple aspects: puckish humor; unswerving belief in the emergence of scientific talent from the third world; deep thought about the nature of creativity, truth, and beauty—and the courage to speak about such matters in absolutist terms.

At the end of a 1994 essay titled “On Reading Newton’s *Principia* at Age Past Eighty,” Chandra wrote, “I am convinced that one’s knowledge of the Physical Sciences is incomplete without a study of the *Principia* in the same way that one’s knowledge of Literature is incomplete without a study of Shakespeare.” No one perusing this collection can help adding, “or the study of Astrophysical Sciences without a study of Chandrasekhar.” Such is the readjustment of the scientific canon to equilibrium in a post-Chandra century.

Electricity and Magnetism in Biological Systems

D. T. Edmonds
Oxford U. Press, New York, 2001. \$75.00, \$40.00 paper (286 pp.). ISBN 0-19-850680-5, ISBN 0-19-850679-1 paper

In the introduction to *Electricity and Magnetism in Biological Systems*, Donald T. Edmonds comments that “all biological function must eventually be understood in terms of electromagnetic

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