chapter, Lankford shows that European and British determination to complete the *Carte du Ciel* froze instrumentation and research design just when astronomical photography was developing exponentially; Oxford University alone invested decades and £20,000 (the equivalent of $15 million in 1990) in this effort. Astronomers at the U.S. Naval Observatory as well as the Dudley, Allegheny, Yale, and University of Virginia observatories did make fundamental contributions to astrometry, but their programs never dominated American astronomy. By eschewing this encumbering international project, U.S. astronomers gained by default.

Besides offering a highly original analysis of the American astronomical community, Lankford addresses contemporary efforts to understand the nature of the scientific enterprise, reminding sociologists of science that an individual's movement through hierarchically ordered reward systems is rarely as linear as often assumed and historians that quantitative approaches deserve renewed consideration. Above all, Lankford's study demonstrates that scientific careers are not determined by merit alone. Scientific communities are embedded in, and shaped by, their surrounding cultural contexts.

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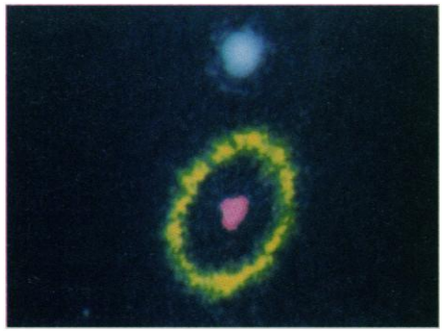
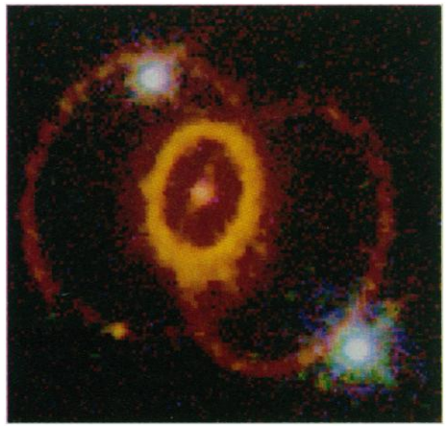
Tales of Neutrinos

Shadow of a Star. The Neutrino Story of Supernova 1987A. ALFRED K. MANN. Freeman, New York, 1997. xiv, 210 pp., illus., + plates. $22.95. ISBN 0-7167-3097-9.

The detection of neutrinos from Supernova 1987A was truly a landmark event in experimental nuclear astrophysics and a high point in the general astronomy of the last half of the 20th century. A great deal has been published about the explosion of the star Sanduleak 202, and scores of journal articles have been written for each of the 20 detected neutrinos. Yet tales of the general scientific activity relating to the observation of these neutrinos are relatively scarce. In this little book, Alfred Mann has given an insider's view of the building and operation of the detector that became the focus of attention in the aftermath of SN 1987A. Being personally involved in the Kamiokande neutrino telescope collaboration, he is intimately familiar with its details, and



"A glowing gaseous ring seen around the tightly packed remnant of SN 1987A in August 1990, which appears as the red blob near the center of the ring. [The blue star is not associated with SN 1987A.] The photograph was taken with the European Space Agency Faint Object Camera and the Hubble Space Telescope." [From *Shadow of a Star*; courtesy NASA]



"Structure of three glowing gas rings seen around the remnant of SN 1987A in February 1994. The yellow orange ring is the plane containing the supernova, with the two larger rings in front and behind that plane. The photograph was taken with the Wide Field Planetary Camera 2 and the Hubble Space Telescope." [From *Shadow of a Star*; courtesy of NASA and Christopher Burrows]

he successfully conveys the excitement of the first discovery of neutrinos from an extrasolar source.

The book is roughly divided into four parts: a general introduction to neutrinos and their significance to astrophysics, the construction and operation of neutrino detectors, the detection of the neutrinos from SN 1987A, and the scientific consequences of this discovery. It is written at a level appropriate for an educated nonscientist, yet contains enough detail that both astronomers and physicists can appreciate both the difficulties and the significance of the neutrino detections. The author's own personal reflections of the drama and the anxiety he felt in the period between the supernova's optical discovery and the subsequent announcement of the neutrino counterpart by the Kamiokande collaboration are particularly eloquent.

The author has a good intuition about what aspects of particle physics, astrophysics, and cosmology are necessary to tell his story. Nevertheless, there are a few lapses—such as his statements that a closed universe is doomed to expand and contract endlessly and that neutrino emission from a newly formed neutron star is necessary to allow it to achieve stability instead of boiling off neutrons and thus "burning up." More curious is the alternative he gives to a neutron star remnant forming in SN 1987A. He correctly points out that a black hole could now exist at SN 1987A's center, since little evidence of a pulsar, a magnetized rotating neutron star, has been found there to date. However, in proposing that a black hole could have formed because Sanduleak 202 overshot the stable neutron star state, he ironically ignores the neutrino evidence that is the kernel of his book. If a black hole is now present, its formation likely followed the demise of a metastable protoneutron star. The 12-second burst of neutrinos that Kamiokande detected would have occurred only if a neutron star had, at least briefly, existed as the remnant of Sanduleak 202's core.

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Other Books Received

Adversaries and Authorities. Investigations into Ancient Greek and Chinese Science. G. E. R. Lloyd. Cambridge University Press, New York, 1996. xviii, 250 pp. $54.95, ISBN 0-521-55331-8; paper, $19.95, ISBN 0-521-55695-3. Ideas in Context.

Biology and Evolution of the Gnetales. University of Chicago Press, Chicago, 1996. ii, 125 pp., illus. Paper, individuals, $11; institutions, $33.65. *International Journal of Plant Sciences*, vol. 157, no. 6 (Nov. 1996), Supplement. From a symposium, 1995.

Classical Field Theory. Electromagnetism and Gravitation. Francis E. Low. Wiley, New York, 1997. xii, 427 pp., illus. $59.95. ISBN 0-471-59551-9.

Development and Progress in Sediment Quality Assessment. Rationale, Challenges, Techniques and Strategies. M. Munawar and G. Dave, Eds. SPB Academic, Amsterdam, 1997. xvi, 255 pp., illus. $93.75 or Dfl. 150. ISBN 90-5103-133-5. Ecovision World Monograph. From a symposium, Göteborg, Sweden, Aug. 1994.

Electronic Structure and Properties of Non-Transition Element Compunds. D. V. Korolkov. Nova, Commack, NY, 1996. xii, 431 pp., illus. $97. ISBN 1-56072-410-2.

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The Manson Impact Structure, Iowa. Anatomy of an Impact Crater. Christian Koeberl and Raymond R. Anderson, Eds. Geological Society of America, Boulder, CO, 1996. vi, 468 pp., illus. Paper, $99.50. ISBN 0-8137-2302-7. Special Paper 302.