this marriage modern theoretical astrophysics was born.

It is the wish of the author of *The Analysis of Starlight* to provide the practicing astronomer with "an interpreted guide to the literature covering the development of observational stellar spectroscopy" (p. ix). This formidable goal is met in a quantitative sense. The reader is led through a series of thematic chronologies on the growth of spectroscopic instrumentation in the 19th century; problems faced by early workers concerned with the origins of the Fraunhofer spectrum; schemes of stellar spectral classification; the exploitation of the Doppler effect; the emergence of quantitative astronomical spectroscopy; the birth of astrophysics; and a host of miscellaneous topics ranging from the analysis of peculiar stellar spectra to supernova spectra and the influence of the interstellar medium on stellar spectra.

Hearnshaw, a New Zealand astronomer, has produced an impressive collection of detail that should delight some specialists. There are, to be sure, some nice insights, but because Hearnshaw elected not to utilize the wealth of secondary literature on the history of modern astronomy, alas, there are serious defects as well.

One persistent problem is a failure to convey a sense of who many of the players were: where they came from and what in their training, position, or character led them to make their mark. Names move in and out of the scene, with too little introduction or context provided to give the reader an appreciation of why they did what they did.

Hearnshaw's treatment of Norman Lockyer's work is a case in point. Misrepresenting his theory of stellar evolution, Hearnshaw claims that Lockyer's rhetoric was "woolly" and would be "entirely unacceptable in scientific publications of today" (p. 93). Without benefit of the later work of Thomson, Einstein, Bohr, and Saha, feels Hearnshaw (p. 100), Lockyer was limited to "unproductive theorising" in his development of the meteoritic hypothesis (p. 93). A more satisfactory conclusion could have been drawn from an exemplary biography of Lockyer (A. J. Meadows, *Science and Controversy*, MIT Press, 1972), which reports his arguments properly. Historians of science specializing in Victorian Britain appreciate Lockyer's behavior and work in the context of his times, and utilization of their efforts would have been logical. Rather inconsistently, Hearnshaw later states, "The early theories of stellar evolution were plausible enough in the context of the known laws of physics at the time" (p. 209).

If there is something lacking for Hearnshaw in contemporary historical studies, there are still numerous places in his text where he could have exploited review articles and advanced textbooks by astronomers. But except for an all-too-brief reference to the 108-page review of astronomical spectroscopy prior to 1930 by R. H. Curtiss ("Classification and description of stellar spectra," *Handbuch der Astrophysik*, vol. 5, part 1, Springer-Verlag, 1932) Hearnshaw has also ignored such sources. When he does mention Curtiss's review paper, he criticizes it for being "a little harsh" on the classification efforts of Antonia Maury because she turned out to be right about luminosity criteria. Apparently Hearnshaw does not sense his own proclivity to judge on contemporary evidence as he feels Curtiss did. When Hearnshaw concludes that Cecilia Payne probably did not trust her own 1925 Ph.D. thesis research that showed a great abundance of hydrogen in stellar atmospheres, he strangely does not cite her own autobiography ("The Dyer's Hand," included in *Cecilia Payne-Gaposchkin*, K. Haramundanis, Ed., Cambridge University Press, 1984), which claims something quite different.

Added to the rather judgmental character of the text, there is an almost complete lack of thoughtful editing; the text is often turgid. Finally, Hearnshaw himself must be disappointed at the poor quality of reproduction of the many illustrations.

Though this is not a book to ignore—in addition to specialist historians, those who teach astronomical spectroscopy and modern physics who are in search of anecdotal material will find it useful—it is a book to be used with some caution and a bit of regret that the publisher did not invest in more editorial support to turn out what could have been a milestone addition to the historical literature.

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Some Other Books of Interest

High-Technology Ceramics—Past, Present, and Future. The Nature of Innovation and Change in Ceramic Technology. W. D. KINGERY and ESTHER LENSE, Eds. American Ceramic Society, Westerville, OH, 1987. x, 388 pp., illus., + plates. $60; to society members, $48. Ceramics and Civilization, vol. 3. From a symposium, Chicago, IL, April 1986.

Derived from a session of an annual meeting of the American Ceramic Society, this volume is concerned both with technological innovation broadly and with its manifestations in the production of ceramics. The volume opens with a chapter by S. C. Reber and M. R. Smith describing recent trends in the study of the history of technology, with particular reference to the writings of Thomas P. Hughes, David Hounshell, David F. Noble, and Ruth Schwartz Cowan. There follows a collection of 14 papers, ranging in length from 8 to 48 pages and of varying degrees of technicality, dealing with specific innovations in ceramics, among them Egyptian faience, Roman glass and concrete, Chinese celadon, refractories in the steel industry, aluminum oxide spark plug insulators, television tubes, and uranium oxide nuclear fuel. The third and final section of the book comprises a summary by Eric von Hippel of his research on "the functional locus of innovation"; a case study by Kim B. Clark and Elaine Rothman of the evolution of ceramic packaging for integrated circuits, an enterprise in which the Japanese firm Kyocera emerged as dominant; an essay by Rustum Roy entitled "The nature and nurture of technological health"; and a discussion by Kingery of recent and projected future developments in ceramics.—K.L.

The New Alliance. America's R&D Consortia. DAN DIMANESCU and JAMES BOTKIN. Ballinger (Harper and Row), Cambridge, MA, 1986. xxii, 209 pp. $29.95.

"The 1980s might be called America's 'R&D consortia years,' " write the authors at the outset of this volume, going on to note that between 1982 and 1986 the number of such collaborations between industry, government, and universities increased fivefold. This volume is the upshot of research the authors, both management consultants, conducted on the phenomenon during that period. Writing in an informal style and quoting extensively from interviews and other sources, the authors present thoughts on such issues as the creation of new technology, technology transfer, the "reshaping" of universities to play a more "activist" role in the economy, the appropriate size and membership of R&D partnerships, the setting of their research agendas, and consortium leadership. The text ends with a 13-page case study of the Microelectronics and Computer Technology Corporation in Austin, Texas, to which "funds are flowing" and which "is so new, different, and on such a grand scale" that its prospects for success are viewed skeptically by some. Appendixes to the book give basic data and brief evaluative comments on the 14 consortia studied by the authors, an "equipment list" for a sample consortium, and the texts of two sample agreements between universities and their partners.—K.L.

(Continued on page 786)