belief the lateral inhomogeneity is unimportant; rather, I expect that the physics of magnetism-induced structuring is so interesting that nature will have elaborated its rich possibilities and be reaping its fruits elsewhere too.

On the other hand, there is a major flaw of "The Sun as a Star" remedied by Thomas here, by including in Chapter 2 a detailed discussion of the intricacies of radiative transfer within the constraints of standard laterally-averaged 'one-dimensional' modeling. This is of interest to stellar workers in their current transition from LTE radiative-equilibrium to empirical NLTE model-building. However, this is not a chapter to be read without prior knowledge! A proper course for a fresh student would be first to study Mihalas' 'Stellar Atmospheres', then to read Athay's 'Radiation Transport in Spectral Lines' and the Vernazza, Avrett and Loeser papers for a flavour of real-life labour, and only then to appreciate Chapter 2 of this book. It reviews NLTE theory and standard modeling while evading numerical solutions through analytical arguments which often provide insight but sometimes confuse, imbedded in a historical sauce clearly intended as corrections to the above books. The chapter serves Thomas to set up today's standard modeling as a testing ground disproven observationally in Chapter 3, and therefore discarded in Part III. This seems too hard a verdict since undoubtedly the known complexities of radiative transfer have to be combined with yet unknown complexities from other domains of physics to describe a star properly. Standard modeling is surely not all in vain, even if Thomas makes it abundantly clear that it is very much incomplete, and undoubtedly often wildly off the mark.

Personal copies of this book and of the other volumes in this series can be requested by researchers who are active in the field from the Series Organizers: Dr. S. D. Jordan, Organizer NASA, code 682, NASA Goddard Space Flight Center, Geenbelt MD 20771, U.S.A., for astrophysicists in North and South America, and Dr. R. N. Thomas, Organizer CNRS, Institut d'Astrophysique, 98bis Boulevard Arago, F–75014 Paris, France, for astrophysicists in the rest of the world.

Sterrenwacht 'Sonnenborgh' ROBERT J. RUTTEN
Utrecht

Sidney C. Wolff, *The A-stars: Problems and Perspectives*, CNRS–NASA Monograph Series on Nonthermal Phenomena in Stellar Atmospheres, NASA Special Publication SP–463, 1983, xlv + 211 pp., including summary in English, summary in French, reference list, subject index and star index, CNRS – Paris, NASA – Washington.

This book was the third volume to appear in the CNRS–NASA Monograph Series on nonthermal phenomena in stellar atmospheres. In the dividing scheme adopted in this series which by and large follows spectral type, if fits between its sister volume 'B-stars With and Without Emission Lines' on the one hand and 'The Sun as a Star' and the yet-to-appear volume on F-, G-, and K-stars on the other hand. As with these other

volumes, the stress is on all the observed phenomena that are not explainable by stretching classical equilibrium modeling to its limits. Together, these books mark the current era of transition from modeling the overall structure of stars and stellar atmospheres, as gas spheres of elegant simplicity with only few pathological exceptions, into the new viewpoint of wonderment and admiration struck precisely by the exceptions, the non-equilibrium phenomena and the non-thermal processes.

The A-type stars certainly merit their own volume. They form the pivot spectral class between the two major topics of current non-thermal stellar research, hot-star winds and cool-star activity, and they are bound to be even more complex, not being dominated either by radiative pushing of atoms or by convective pushing of magnetic fluxtubes alone. Indeed, A-type stars have never been normal: "abnormalities are the rule, rather than the exception; there are probably no slowly rotating late A-type stars that could reasonably be classified as normal" (page xxxiii). Special properties abound: partial hydrogen ionization, chemical anomalies, enormous magnetic fields, rotational and binary class distinctions, radial and unexpected non-radial pulsations, absence of chromosphere indicators combined with presence of X-ray emission, etc.

Altogether, these stars may represent the ultimate proving ground for non-thermal modeling, combining formalisms derived from the hotter and cooler stars with special A-type stratagems as the oblique rotator and radiative diffusion. For the moment, it is best to study their behaviour with an open mind, and so this book is largely an observational overview. It is a well-organized, highly readable account of the observational and interpretational state of affairs, making clear that there is a long way yet to go while at the same time providing a good basis for future work.

The book has an excellent summary, presented both in English and in French as is the habit of this series; it provides some 700 references and it has a useful star index. It belongs on the desk of every astronomer who works on stars, and of course in every astronomical library.

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L. R. Lyons and D. J. Williams, *Quantitative Aspects of Magnetospheric Physics*, D. Reidel Publ. Co., Dordrecht, Boston, Lancaster, xv + 231 pp., 1984, Cloth Dfl. 130,– / US$ 49.50.

This book gives a very clear presentation of the theory and related observations of the