understanding of the solar atmosphere as the result of the flight of Skylab, the OSO-8 satellite and detailed solar-wind studies. In some ways it is therefore already somewhat outdated. Athay makes only minor mention, for example, of what now turns out to be one of the major recent discoveries in solar physics: the identification of the so-called "coronal holes" and their associated open magnetic-field configuration as Julius Bartels's M regions, which are responsible for the geomagnetic disturbances.

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Equilibrium and Non-equilibrium Statistical Mechanics

R. Balescu
742 pp. Wiley, New York, 1975. $29.95

The field of non-equilibrium statistical mechanics has long awaited a definitive graduate-level textbook. At last a leading practitioner, Radu Balescu of Brussels, has presented us with a big, beautifully produced book, which we open with great expectations. We are promised an integrated approach to classical and quantum equilibrium and non-equilibrium statistical mechanics.

One notes with pleasure many hoped-for topics: distribution functions, Wigner functions, thermodynamic limit, the ergodic problem, critical phenomena, Green–Kubo relations and the long tail of correlation functions, dense fluids and normal modes of linearized kinetic equations. The treatment is lucid, the style is lively.

Embedded in this textbook, and occupying seven of the eleven non-equilibrium chapters, one finds a monograph on subdynamics, a Brussels speciality. Because it appeals to an advanced audience, this material should have been published separately. The treatment here becomes highly mathematical, detailed and clear, but the astounding claims made appear to me unproved as presented.

Returning to the textbook proper, one finds three chapters on general concepts and seven on equilibrium, preceding the four on non-equilibrium for the non-specialist. Here, admiration for the clarity of the new topics is balanced by disappointment at omissions, obscurities, and obsolescence. For example, Balescu's treatment of the relation of thermodynamics to statistical mechanics appears perfunctory, with no mention of adiabatic processes; he obtains the hydrodynamic moment equations only from the Boltzmann equation, making no reference to the Kirkwood–Zwanzig technique; the Chapman–Enskog equation he solves by the Sonine expansion, without the use of variational methods; he introduces the transport coefficients without reference to dispersive properties; the treatment of plasmas, which is vintage 1960, ignores the work of the last 15 years, and the photon and phonon gases are dismissed in a short paragraph. I found an occasional tendency to present formulas without interpretation; the most glaring example is the definition and use of the symbol Λ without its identification as de Broglie length. The omission of problems constitutes a serious flaw—these could have illustrated and extended the treatment in the text.

I conclude with thanks to the author for undertaking this monumental presentation; my disappointment is tempered by the hope that a second edition will find these flaws overcome.

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Gauge Theories of Weak Interactions

J. C. Taylor
167 pp. Cambridge U.P., New York, 1976. $26.50

Since 1970 many exciting developments in theoretical particle physics have been in work concerning gauge theories. It is today an extremely active research area. Many features of these theories are yet to be fully studied. However, in the area of weak-interaction physics their application is relatively well-understood, and such theories provide a coherent and theoretically satisfying description of the phenomena observed. Recent new particle discoveries fit beautifully into this picture—they may well be the charmed particles that are a necessary component of gauge theories of the weak interactions.

Given this satisfying situation, it is indeed welcome to find a textbook that provides the necessary information to enable a student to become familiar with these theories. *Gauge Theories of Weak Interactions* is such a book. J. C. Taylor has been a steady contributor to the development of gauge theories over the past several years. His clearly written book begins at a level comprehensible to any student familiar with the basics of quantum field theory. The book is brief, but the material covered is extensive—Taylor does not waste words. It will require considerable work on the part of any student to master all the concepts and techniques presented. However, Taylor provides a clear path for the student to follow and ample references to the literature for further discussion of most points. (One reference I miss is to Sydney Coleman's 1973 Erice lectures on "Secret Symmetry". These lectures in-