the treatment of Goethe and the Romantic period. The Age of Rationalism followed Newton because his clockwork-mechanism approach became the philosophy of the day. Romantism was an attempt to return to the organismic world-view of Aristotle. Goethe is shown as having tried to span this culture gap by development of his physics. His optics attempted to view the observer and light as a kind of unity, that is, in an organic way; the attempt failed. Goethe's character Faust attempts to go beyond a mechanistic view in his search for meaning to life. A modern analogy is perhaps the scientist, such as Robert Oppenheimer, who goes beyond his usual pursuits, contracts for "Faustian power" and ultimately finds he must pay according to a demonic justice.

The more recent interactions of science and society treated by Schroeer include idealogical control of science, art, radioactive dating, the development of nuclear weapons, nuclear medicine, science funding, science in the universities, NASA, the energy crisis and several others. Attempts at idealogical control of science in Nazi Germany and also some examples from the USSR and the US are examined. We learn not only how x rays have affected the analysis of paintings but also how the Bauhaus school attempted to integrate technology into their arts. The anti-ballistic-missile issue is examined as an example of scientists moving out of the areas of consensus and engaging in political debate. The total range of subject matter treated with considerable grasp is really startling.

The style and typography of the book makes it easy reading. What physics is presented is quite readable by a nonscientist. The chapters each have introductions and summaries and are broken up into small units that make the structure of the author's analysis apparent. There are extensive bibliographies and provocative questions at the end of the chapters, so the book is useful as a text (its intended purpose). Necessarily, the treatment of any one of so many subjects is short, but because of the thematic approach the analyses effectively avoid superficiality. Indeed, despite Schroeer's misgivings stated in the first chapter one might see the book as a small bridging of the two-cultures gap. He has taken apart a great variety of topics to examine their inner workings but has managed to gain an organismic or "big picture" view of the entire range of science–society meetings.

As a final note we may return to the point brought up in the first paragraph of this review. Does the scientist bear such a responsibility to society that he must turn to the job of solving society's technological problem? Dubos feels he must turn to such tasks: Society has supported science strongly in the past, and now scientists must pay for their Faustian power by working according to criteria and for goals set up by society. Schroeer comes to a somewhat different conclusion. While he realizes that science support may be judged on the basis of criteria external to science, he reasons that social responsibility involves a scientist acting in a nonscientific way, that is, in directions concerning which there can be no consensus. The scientist is not then responsible for the crises of technology. It would seem to follow that he would be untrue to his profession to follow Dubos's call. I follow Schroeer's logic, but my humanistic inclinations are that, if there is indeed a conflict here, Dubos is the one who is correct.

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Statistical Physics

Yakov P. Terletskii
N. Fröman, trans. 279 pp.
North-Holland, Amsterdam, Holland, 1971. $18.00

Except for minor changes and additions, this book is a translation of Yakov P. Terletskii's *Statisticheskaya Fizika*, which was published in Moscow in 1966. The contents evolved from a course given by the author to Moscow State University students whose program, at that time, contained a concurrent course in quantum mechanics. Accordingly, quantum statistics is delayed until the next to the last chapter and constitutes about 14% of the text.

After brief sketches of thermodynamics and probability, ensembles are discussed and applied to classical models of gases, solids and radiation fields. Chapters 3 and 4 contain discussions of correlations, fluctuations, Brownian motion, Onsager's reciprocity relations, the Einstein–Fokker–Planck equation, and Nyquist's formula; and Chapter 5 deals with the Boltzman equation, the *H* theorem, entropy and irreversibility. One returns to equilibrium in Chapter 6 where the quantum distributions are used to obtain the conventional results for heat capacity, black-body radiation, and ideal Bose and Fermi gas behavior. Stimulating essays on negative temperature, the second law of thermodynamics, and on possible macroscopic violation of classical thermodynamics make up the final chapter.

Problems are given at the end of all chapters except the last, and 40 pages of answers and solutions are included at the end of the text.

The general technical level of the material is similar to that of Frederick Reif's, *Fundamentals of Statistical and Thermal Physics;* however, detailed motivation and illuminating examples such as simple spin models, which both Charles Kittel and Reif have used so effectively, do not play as prominent role in Terletskii's book.

In sampling the translation I found that certain typographical errors that existed in equations in the Russian edition have been corrected; however, as if by some treacherous conservation law, new misprints have appeared elsewhere; for example, in the Chebyshev inequality, equation 2.29; in the discussion of the author's proof of the recurrence theorem; and in equation 21.8.

In summary, if one is involved in the teaching of graduate statistical mechanics, this book appears worth considering as a reference, particularly with respect to Gibbs's approach. For those fortunate enough to read Russian, the 1966 Russian edition, recently available in New York for $1.50, is a real bargain.

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The Raman Effect. Volume 1: Principles

Anthony Anderson
404 pp. Marcel Dekker, New York, 1971. $28.50

Discovered in 1928 by C. V. Raman, the effect named for him consists of the appearance of new lines in the spectrum of the monochromatic light scattered by molecules, the frequencies of the new lines being characteristic of the molecules that did the scattering. The Raman effect is thus useful for the identification of molecules, for the determination of their structures and for the solution of a wide range of problems in physics and chemistry.

Early work in Raman spectroscopy was hampered by the lack of intense light sources of a suitable geometry. Since the appearance of strong laser light sources, there has been a resurgence of interest in this field, and there have been many new developments. The aim of this book is to provide a basic coverage of the theoretical and experimental principles of Raman spectroscopy and to discuss important applications in physics and chemistry.

The book has several authors. R. S. Krishnan, who has made important

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contributions in this field since the discovery of the Raman effect up to the present time, discusses the early history, theory, techniques and developments during this interval and lays the foundation for the more specialized treatment given by the other authors. He also presents an extensive detailed review of Brillouin scattering.

G. W. Chantry gives a detailed, lucid, and interesting review of the polarizability theory of the Raman effect, including the classical and quantum theories, the theory of the intensities of Raman bands and Wolkenstein's band-polarizability theory, and concludes with a discussion of the present state of the theory of Raman spectroscopy.

R. A. Cowley reviews the theory of Raman scattering from crystals, including discussions of symmetry properties, one- and two-phonon Raman effects, anharmonicity, defects in crystals and scattering by electronic excitations.

C. E. Hathaway discusses light sources, techniques of illumination, detection and measurement, monochromators, and commercial spectrometers.

And P. Lallemond discusses the theoretical analysis, experimental studies, and applications of the stimulated Raman effect (an effect in which the intensity of the light scattered per unit solid angle and per unit frequency bandwidth is not proportional to the intensity of the incident light beam).

The book will be useful for graduate students and other researchers in Raman spectroscopy and related spectroscopic fields, as well as for those working in fields such as lattice dynamics, crystal structure and chemical equilibria. It is one of the few books that give a comprehensive treatment of Raman spectroscopy to include the re-