potential expansion, where the quadrupole term is shown but not named.

This text is on a less advanced level than the two above-mentioned texts. Among the topics omitted entirely are four-vectors, Cerenkov radiation, and the Doppler shift. Plasma physics is treated only in the problems. The mathematical methods are shown clearly whenever needed, and are directed to a less mature audience than are Panofsky and Phillips or Jackson. One characteristic of the style which is not appreciated by this reviewer is the writing out of matrices and integrals *in extenso*.

Rationalized mks units are used. The problems at the end of each chapter are carefully written and appropriate.

In summary, this book is recommended as a modern text in electrodynamics, especially for advanced undergraduate use.

A Stress Analysis of a Strapless Evening Gown and Other Essays for a Scientific Age. Robert A. Baker, ed. 192 pp. Prentice-Hall, Englewood Cliffs, N. J., 1963. $3.95.

Reviewed by ***J. Gillis,*** *Weizmann Institute of Science, Rehovot, Israel*

The purpose is to establish the proposition that scientists are human, or at any rate not less so than most other people. The method of proof is to reprint a collection of essays, some by scientists and others about them, all written with humorous intent. The proof is less than rigorous and would not have satisfied the reviewer but for the fact that he had never doubted the central proposition.

The essays are taken from a wide variety of sources, including *American Scientist, Drug and Cosmetic Industries,* the *Journal of the American Statistical Association,* and the *Journal of Irreproducible Results.* The level of humor varies considerably, in fact ranges fairly evenly from the puerile to the subtle. The printing and illustrations are elegant, and the book is good value for an evening's mild entertainment.

The essay which provides the title is neither the first nor the longest, nor is it particularly representative of the contents of the book. One feels that the motivation behind the choice of title was similar to that which determines the covers of pocket-books. The timing of publication in relation to the gift buying season was probably also not accidental.

Having said this much about the book itself, the reviewer now feels entitled to speculate on a few topics which rise to mind. He was taught in his youth that it was unreasonable to expect a genius to behave like a normal human being since, after all, it was not normal to be a genius. The attitude makes sense but the facts are against it. Experience has shown him that the truly great geniuses are nearly always decent, sociable, housetrained, and perfectly respectable members of society. It is the second-raters, those who have just failed to make it, who so often find it necessary to display their eccentricities as supplementary evidence of genius. He has also noticed that this display of sub-genial eccentricity is generally a deliberate act without emotional sincerity. It usually takes the form of demonstrative rudeness, always directed at strangers, underlings, or others who cannot advance the scientist's career. But it normally gives way to obsequious politeness towards those who can help the great advance, if only by having names big enough to make a bang when dropped.

One can think of many exceptions to every one of the above statements, but if that sort of reason is ever allowed to invalidate a sociological theory, how many sociologists will be left in business?

Magnetic Resonance at High Pressure. By G. B. Benedek. 100 pp. Interscience, New York, 1963. $4.75.

Reviewed by ***Norman H. Nachtrieb,*** *University of Chicago.*

This little volume is highly recommended to chemists and physicists who are concerned with solid- and liquid-state research. It not only indicates the wealth of new information that can be obtained by extending magnetic resonance investigations to high pressures, but also recounts the remarkable sophistication in experimental technique that already exists. Chapter 1 deals with the pressure dependence of resonance phenomena in crystalline solids (Knight shift in alkali metals, Mössbauer effect, electron spin resonance in ionic crystals, and electric

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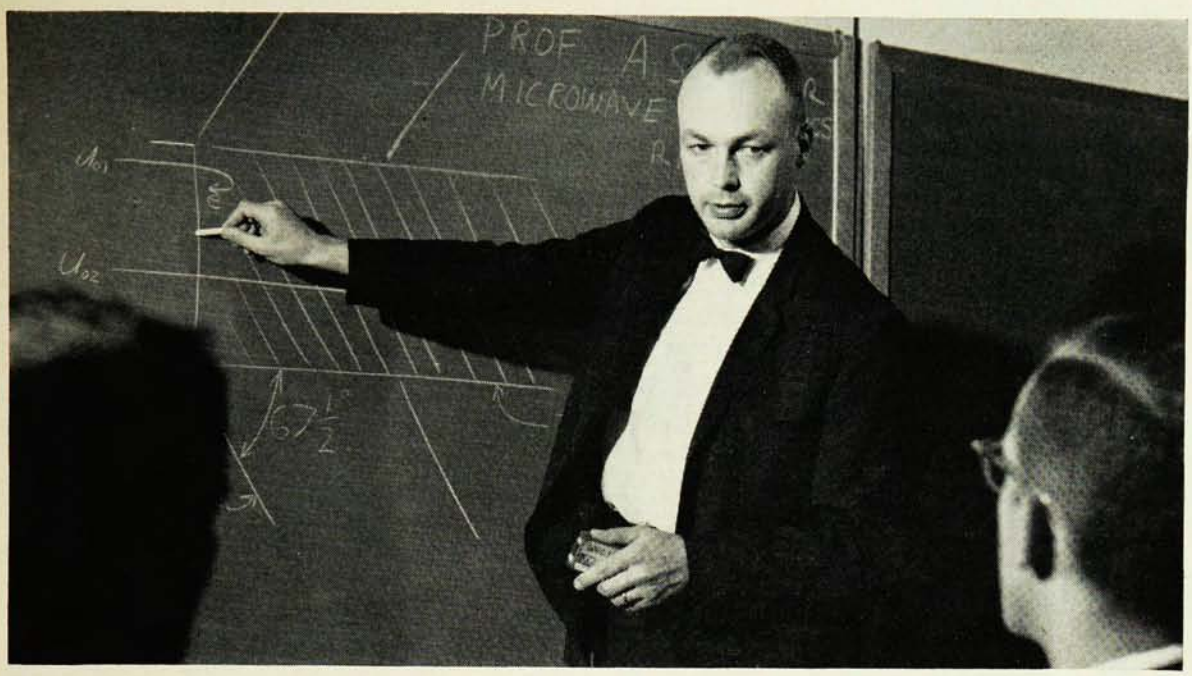

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field gradients from pure nuclear quadrupole resonance), and with relaxation effects (diffusion in alkali metals and hindered rotation in molecular solids) that are characterized by spin-lattice (T_1) and spin-spin (T_2) relaxation times. Benedek's own contributions to the Knight shift demonstrate that the shift is an explicit function of temperature at constant volume. This is well explained by the effect of thermal lattice vibrations in modulating the coupling of the conduction electrons' spin with the nuclear spin. Other interesting observations include the *decrease* in the mean lattice vibration frequency with pressure in cuprous oxide from the pure quadrupole resonance spectrum of Cu^{63}; this is unusual behavior, since the Grüneisen constant is ordinarily a positive quantity ($\gamma = -\partial \ln \nu / \partial \ln V$). The discovery that the nuclear magnetic resonance frequency of Fe^{57} in metallic iron decreases linearly with pressure to at least 65 kilobars provides the basis for continuous pressure calibration into the region of "superpressures." One of the most sensitive of all physical measurements is the Mössbauer line shift; the pressure dependence of the shift of the 14.4 keV gamma ray of Fe^{57} in metallic iron amounts to only 7.8 parts in 10^{15} over the pressure range, 1 to 3000 atmospheres, and is due chiefly to the change in the mean lattice vibrational energy with pressure. These results give some idea of the extraordinary amount of detailed information on the electronic structure and lattice dynamics that can be obtained by combining high pressure techniques with resonance methods. Chapter 1 also details the elegant work of Barnes and his coworkers on the pressure dependence of self-diffusion in solid lithium and sodium metal, based upon the measurement of the spin-spin relaxation time of their nuclei. Hindered rotation effects in molecular solids and the kinetics of diffusion and ortho-para conversion in solid hydrogen have also been studied up to fairly high pressures.

Chapter 2 is concerned with nuclear magnetic resonance experiments in liquids and gases. The classical experiments by Dickinson on the paramagnetic shifts of cobalt complexes in aqueous solution, which are explained by the admixture of excited paramagnetic states into the ground state orbitals of the metal-ligand bond, have now been studied as a function of pressure. This opens up the possibility of obtaining the crystal field splitting as a function of the metal-ligand distance. Gaseous xenon exhibits a paramagnetic chemical shift which is proportional to the gas density, and is attributed to the decrease in the diamagnetic shielding by the collision-induced deformation of the electron distribution around the nucleus. As in solids, the pressure dependence of the spin-lattice relaxation time has led to valuable information on the activation volume for self-diffusion in liquids, and extensive studies have now been made on water, methyl iodide, and a variety of paraffinic hydrocarbons by the spin-echo method.

An all-too-brief appendix provides an overview of some of the experimental techniques which are useful in generating hydrostatic pressures and superpressures, together with bomb designs for magnetic resonance applications.

The book is very well written, by an author whose own contributions to the field are outstanding. Errors are few, and references to the outstanding papers are quite complete.

Elementary Chemical Thermodynamics. By Bruce H. Mahan. 155 pp. Benjamin, New York, 1963. Paper $1.95, Cloth $3.95. *Reviewed by* ***Joseph L. Katz****, University of Copenhagen.*

The study of thermodynamics has been usually postponed until a student's junior or senior year. This excellent introductory text by Professor Mahan will—permit those many instructors, who, until now, were deterred by the lack of a suitable elementary book, to include a brief session on thermodynamics in their general chemistry course.

The book is very carefully written. Despite very elementary language and mathematics a high level of rigor is maintained. The author begins by defining the basic concepts, "system", "state", "state function", "equilibrium states", and "temperature". He proceeds to a discussion of the first law, using many examples to illustrate that