curs in connection with a hydroelectric power system is studied by the method of slowly varying amplitude and phase.

Diffraction and scattering problems. H. Levine, "Acoustic radiation pressure on a circular disk." W. Magnus, "Infinite matrices associated with a diffraction problem" (abstract only). A. E. Heins and H. Feshbach, "On the coupling of two half-planes." The authors are concerned with the effect of a plane wave incident upon two infinite half-planes of different acoustical materials joined along a straight line. G. F. Carrier and W. H. Munk, "On the diffusion of tides into permeable rock." The problem of water-level fluctuations in the irrigation wells is formulated mathematically by assuming the observed groundwater fluctuations to represent a diffusive transmission of the tidal disturbances through the porous volcanic structure. J. J. Stoker, "Some remarks on radiation conditions." The difficulty on the uniqueness of steady-state solution in unbounded domains may be avoided by formulating the problem as an appropriate initial value problem and then finding the solution of the steady state by limiting process in allowing time to tend to infinity. E. W. Montroll and J. M. Greenberg, "On the theory of scattering of plane waves by soft obstacles." An obstacle is considered to be soft if the wavelength of the wave inside the scatter does not differ much from that of the incident wave in the absence of the scatterer. Progress on this problem is reported.

Vibration theory. E. H. Lee, "Wave propagation in helical compression springs." A. Weinstein, "On the wave equation and the equation of Euler-Poisson." A general discussion of results on a class of hyperbolic partial differential equations which includes the classical wave equation as a special case is given. S. Lefschetz, "On the Lienard differential equation." R. J. Duffin and A. Schild, "The effect of small constraints on natural vibrations."

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Fatigue of Metals. ed. 3 of *La Fatigue des Metaux.* R. Cazaud. Trans. by A. J. Fenner. Philosophical Library, New York, 1953. 334 pp. Illus. + plates. $12.50.

This book is essentially an English translation of the author's 1948 edition of *La Fatigue des Metaux.* It discusses the characteristics of fatigue failures, theories of the mechanisms of fatigue in metals, fatigue testing machines, influence of various factors such as size, speed of test, overstress, understress, residual stress, notches, sharp shoulders, surface conditions, and corrosion. It includes a chapter on fatigue strength of structural joints and another on improving the fatigue strength of machine components.

The description of fatigue-testing machines is predominantly concerned with European practice, as would be expected. The few references to American testing machines are not representative of recent practice and do not reflect the fine work done in this field. The discussions of the effects of various factors are an interesting review and should serve as a valuable summary for engineers in general. The chapters on fatigue strength of structural joints and on improvement of fatigue strength of machine components should be of great value to designers in pointing up the practical application of the accumulated knowledge of fatigue of metals.

The book is well written and authoritative. However, it is not as modern as the date of publication (1953) would indicate. Practically all the data discussed were developed prior to 1948. Nevertheless, it is a valuable book for the practicing engineer to have on his bookshelf, for it will serve well as a ready reference on the subject.

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Statistical Analysis in Chemistry and the Chemical Industry. Carl A. Bennett and Norman L. Franklin. Wiley, New York; Chapman & Hall, London, 1954. xvi + 724 pp. Illus. $8.

Owing to the rapidly accelerating interest that has developed since 1947 in the use of modern statistical methods in the field of chemistry, the Committee on Applied Mathematical Statistics of the National Research Council and the Mathematics Branch of the Office of Naval Research have sponsored the preparation of this comprehensive book on applied mathematical statistics, with illustrative material from chemistry and the chemical industry. The authors were carefully chosen; one is a mathematical statistician with experience in chemistry, and the other is a chemist with knowledge of mathematical statistics. The sponsors and authors had the advice and cooperation of a host of statisticians and chemists of outstanding professional ability.

This remarkable planning and fine cooperation have resulted in a work of broad scope, as is indicated by its 11 chapter headings: "Introduction," "Descriptive statistics," "Probability and samples," "Mathematical machinery," "Statistical inference," "Relationship between variables," "Analysis of variance," "Design of experiments," "Analysis of counted data," "Control charts," and "Some tests of randomness."

The mathematics used is not beyond the ability of an engineering or chemistry graduate, thus placing the level between that of the standard textbooks of mathematical statistics and that of books dealing mainly with applications of statistical methods. The more theoretical topics are relegated to appendixes at the ends of several chapters. Many statistical techniques are presented and abundantly illustrated with appropriate examples from chemistry. Numerous tables make possible the numerical calculations involved in application of these techniques. However, there are no unsolved examples on which the student can test his knowledge.

Statistical Analysis can be studied with profit by physical scientists and engineers with some knowledge of statistics and by students of mathematical statistics interested in applications. However, it is doubtful whether the on-the-job chemist without formal