Physical chemistry for premedical students. John Page Amsden. New York and London: McGraw-Hill, 1946. Pp. ix + 298. (Illustrated.) $3.50.

The inclusion of physical chemistry in the already full curriculum of the premedical student has necessitated the writing of textbooks which can be used in a course of only one semester. This book has been written with the object of meeting this demand and treats only those subjects which may be of value to the premedical student. Two admirable features are: (1) the inclusion, as the first chapter, of a discussion of dimensions and units, and (2) a useful correlated list of visual aids at the end of the book. The subjects covered are gases, liquids, electrolytic and nonelectrolytic solutions, chemical equilibrium, hydronium ion, oxidation and reduction, speed of reaction, catalysis, adsorption, colloids, and the Donnan equilibrium. Bronsted's concept of acids and bases and the hydronium ion is used throughout the book. Suggested experiments which may be used as lecture demonstrations are frequently given. The use of the equations developed in the text is illustrated by solved examples. A set of problems of increasing difficulty is included at the end of each chapter. The use of calculus is held to a minimum in the derivation of the equations, and the mathematical requirements of the students are an ability to solve quadratic equations and to use logarithms.

While the scope of the book seems adequate, many incomplete or inaccurate statements and discussions have been noted. Probably the most important of these occur in the first chapter, on units and dimensions. Zero degrees centigrade is defined as the freezing point of pure water at one atmosphere pressure without mentioning the necessity of the water being saturated with air at this pressure; absolute zero is given as −273.13° C. rather than −273.16° C.; one calorie is given as equal to 4.187 joules rather than 4.185 joules; the atmosphere is defined in terms of the height of a column of mercury without introducing the concept of the measurement being made at 0° C.; and no clear distinction is made between international and electrostatic units of electricity. Among the incomplete and even erroneous discussions which may easily lead to gross misconceptions are those concerned with the deviations of real gases from the ideal gas laws and with the critical temperature and critical pressure. Other major criticisms concern the statement that the equilibrium constants are a function of the temperature only, and the fact that the experiment described on page 163 does not clearly distinguish between the effect of temperature on the rate of reaction and on the equilibrium. Also, there is no mention of the assumptions made in the solution of such problems as the calculation of the hydronium ion concentration in solutions of a salt of a weak acid and a weak base.

In the opinion of the reviewer the over-all criticism of the book is that too great a simplification has been made of the physical phenomena discussed at too great an expense of accuracy. However, only the author and those who may use this book can resolve this difficulty with respect to the aims of their courses in physical chemistry for premedical students.

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Advancing fronts in chemistry. Vol. I: *High polymers.* Sumner B. Twiss. (Ed.) New York: Reinhold, 1945. Pp. 196. (Illustrated.) $4.00.

In this volume, containing 10 lectures given in 1944, aspects of two general problems are covered: the mechanism of building up of the polymer molecule, and the physical properties of high polymer systems as related to molecular characteristics.

Four lectures are devoted to the first subject. A paper by E. C. Pitzer discusses possibilities of catalytic preparation of important monomers from hydrocarbons and reviews briefly methods of preparation of several industrial catalysts. The inclusion of such material, rarely given in a monograph of this kind, is to be recommended. W. H. Stockmayer considers the kinetics of polycondensation reactions and the formation of branched and cross-linked structures. This chapter should be particularly useful to those desiring an insight into the physical picture, principal results, and assumptions made without following the calculations in detail. Two articles are devoted to chain polymerization reactions. The nature of the initiation catalyzed by free radicals is discussed in detail by C. C. Price. F. R. Mayo's chapter deals to a large extent with effects of the medium in solution polymerization.

Polymer solids and concentrated solutions form the subject of the other six chapters. Two of these, by H. Mark and S. S. Kistler, respectively, contain a general description of features common to all chain polymers as well as some of those which impart to each type a set of characteristic mechanical properties. The situation is examined further in an extensive paper by W. O. Baker, with particular reference to polyesters and polyamides, on the basis of X-ray diagrams, dielectric and mechanical performance. The behavior of concentrated solutions under periodic stress is considered by J. D. Ferry. Detailed attention is given by E. Ott to two parameters, the average degree of polymerization and the molecular weight distribution, as affecting bulk properties as well as thermodynamic and viscosity behavior in solution for cellulose esters. The series is concluded by M. Harris, who discusses the elasticity of wool in relation to chemical structure and its modifications as produced in the laboratory.

This monograph can well be recommended to the research worker in other fields and to the practical polymer technologist who wishes to familiarize himself with some more "theoretical" concepts. Those actively engaged in one or the other phase of polymer research will find the information presented and the references given very useful.

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