

RECENT BOOKS

CHEMICAL ARITHMETIC (School Certificate). *F. W. Goddard*, M.A., F.C.S., Senior Science Master, The College, Winchester. Longmans, Green and Co., New York City, 1937. vii + 99 pp. 12 × 18.7 cm. \$0.65.

A first glance at this book causes some disappointment that it is not more suited for use in American schools, but a careful examination shows that there is apparently a need for such a volume in English schools. It should, therefore, justify its publication. Apparently English chemistry texts do not include the problems that form a prominent part of many American texts. To quote the preface, "I (the author) think that it is generally admitted by teachers that the supply of numerical questions, in readily accessible form, is rather inadequate and yet such questions are most useful when setting out of school work."

The author says correctly, "A knowledge of the principles of chemical arithmetic and a facility in dealing with the types of manipulation involved are of fundamental importance to the student of chemistry. . . . The principles involved are briefly explained, typical examples are worked out and there are about three hundred questions, all numerical, mostly taken from recent School Certificate papers set by the various Examining Boards."

The author, having the student's needs in mind, says, "In order to cater to the less intelligent pupils the questions are usually duplicated so that the boy who needs much assistance with one example will find another exactly similar one for his unaided attention. Further, the questions have also been carefully graded so that the able boy can progress by himself."

Specific points which caught the reviewer's eye included:

Chapter 1. The method of solving for the per cent. of water in crystallized borax might be improved upon. To multiply a common fraction which has no direct relation to one gram of crystallized borax by "100 grams of water" is not particularly good arithmetical reasoning. The older term "water of crystallization" instead of the newer and preferable "water of hydration" is used here as well as on pages 38 and 43. The problem illustrating the Law of Constant Composition (Definite Proportion) is cleverly chosen and well solved.

Chapter 2. The author does not differentiate between S.T.P. and N.T.P. as used in gas law problems, and throughout uses N.T.P. incorrectly as signifying 0°C. and 760 mm. It is a pleasure to note on page 7 problems involving both gas laws are solved not only by the $PV/T = P'V'/T'$ formula but also by the "common-sense" or "reasoning" method, called by the author working "from first principles."

Chapter 3. A good, though brief, introduction to solubility and solubility curves is followed by five problems in the use of curves.

Chapter 4. Equivalents seem to be unduly stressed, with four different types, eight illustrative problems, and forty-three test problems.

Chapter 5. Problems on the Law of Equivalent Proportions or Reciprocal Proportions seem beyond the first-year chemistry student or ill suited to his needs, while those of Multiple Proportions are appropriately reduced to a minimum.

Chapter 6 on atomic weights, valence, Law of Dulong and Petit, empirical formulas and molecular formulas is not so well presented. Incidentally, the appearance of such formulas as $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ shows that the author is not familiar with the better method, $\text{ZnSO}_4(\text{H}_2\text{O})_7$, adopted for hydrated salts by the Division of Chemical Education of the American Chemical Society and used by the Committee on Labels.

Chapter 7 is by far the longest chapter in the book and covers problems on Gay-Lussac's Law, Avogadro's Hypothesis, vapor density, gram-molecular volume, molecular weights, atomic weights (accurate and approximate), molecular formulas of gaseous hydrocarbons, Graham's Law of Diffusion and isomorphism.

Many of the problems are complicated, simultaneous algebraic equations being used in one illustrative problem. The author's attempt to show when to use 22.2 and when 22.4 for the gram-molecular volume might be simplified by omitting all work with the former value.

Chapter 8 on chemical equations and reacting quantities comes back to the first-year student's level with a few well-chosen examples. Curiously enough, the weight-volume and volume-weight types of problems are not developed.

Chapter 9 on volumetric analysis slips back to more advanced work again, and impresses the reviewer as too brief a treatment for collegiate work and too much for the simple treatment of molar and normal solutions considered by many as sufficient for elementary students.

The last eight pages of the book contain tables of logarithms and antilogs, pressure of aqueous vapor, approximate atomic weights, and, best of all, the answers to all the problems. The list of answers is marred somewhat by common fractions linked with metric units and the omission of the answers that "explain" why certain numerical answers are obtained. Naturally, no attempt was made to test the accuracy of the answers, as credit for such work is given in the preface. Eye-strain which might result from consulting the table is cleverly eliminated by printing the numbers of the problems in large bold-faced type and the answers themselves in roman type.

Teachers who are not sufficiently supplied with problem material will doubtless appreciate access to this little book when they want a problem a little different from those they are using.

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ANNUAL REVIEW OF BIOCHEMISTRY, Volume VI. *James Murray Luck*, Editor, Stanford University. Annual Review of Biochemistry, Ltd., Stanford University P. O., California, 1937. ix + 708 pp. 14.5 × 22 cm. \$5.00.

Volume VI of the Annual Review of Biochemistry (1937) contains the following reviews:

"Permeability," R. Collander (pp. 1-18); "Biological Oxidations and Reductions," F. Lipman (pp. 19-42); "Enzymes," K. Linderstöm-Lang (pp. 43-72); "The Application of Microchemistry to Biochemical Analysis," P. L. Kirk (pp. 73-98); "The Chemistry of the Carbohydrates and the Glycosides," W. N. Haworth and E. L. Hirst (pp. 99-114); "The Chemistry of the Lipins," E. Klenk and K. Schuwirth (pp. 115-38); "The Chemistry of the Steroids," R. Schoenheimer and E. A. Evans, Jr. (pp. 139-62); "The Chemistry of the Proteins and Amino Acids," G. S. Adair (pp. 163-92); "The Chemistry and Metabolism of the Compounds of Sulfur," V. du Vigneaud and H. M. Dyer (pp. 193-210); "Chemistry and Metabolism of the Nucleic Acids, Purines, and Pyrimidines," F. Chrometzka (pp. 211-24); "Carbohydrate Metabolism," H. J. Deuel, Jr. (pp. 225-44); "Fat Metabolism," R. G. Sinclair (pp. 245-68); "The Metabolism of Proteins and Amino Acids," S. Edlbacher (pp. 269-90); "Detoxication Mechanisms," A. J. Quick (pp. 291-302); "The Hormones," G. F. Marrian and G. C. Butler (pp. 303-34); "The Vitamins," C. C. Sherman and H. C. Sherman (pp. 335-74); "Nutrition (Energy Metabolism)," M. Kleiber (pp. 375-94); "The Biochemistry of Muscle," D. M. Needham (pp. 395-418); "The Metabolism of Brain and Nerve," R. W. Gerard (pp. 419-44); "The Biochemistry of Fish," C. M. McCay (pp. 445-68); "Chemical Embryology," D. M. Whitaker (pp. 469-88); "Plant Pigments," J. H. C. Smith (pp. 489-512); "The Alkaloids," E. Späth (pp. 513-34); "Photosynthesis," R. Emerson (pp. 535-56);