

original oil, which is equivalent to x g. of acetylated oil. In other words, x g. of acetylated oil require $S(x-42)$ mg. of potassium hydroxide to react with the glycerol esters, Ax mg. to react with the acetate esters and $S'x$ mg. for complete saponification. Therefore

$$S(x - 42) + Ax = S'x \quad (2)$$

Substituting (1) in (2)

$$S \left(\frac{56,000}{A} - 42 \right) + A \frac{56,000}{A} = S' \frac{56,000}{A}$$

Multiplying by $A/56,000$

$$S(1 - 0.00075A) + A = S'$$

Solving for A

$$A = \frac{S' - S}{1 - 0.00075S} \quad (3)$$

Equation (3) is identical with the Cook formula.

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NEW BOOKS

Das Periodische System in Neuer Anordnung mit Tabellen über Fünfzehn Physikalische Konstanten in Anordnung nach der Ordnungszahl der Elemente und nach der Grösse der Konstanten. (The Periodic Table in a New Form with Tables of Fifteen Physical Constants Arranged According to the Atomic Numbers of the Elements and the Magnitude of the Constants.) By DR. DARWIN O. LYON. Franz Deuticke, Leipzig and Vienna, 1928. vi + 40 pp. Illustrated. 17.5×26 cm. Price, unbound, M 8; bound, M. 10.

In an introduction the author first discusses rather broadly the origin and structure of matter. Next there is a cursory presentation of the Thomsen-Bohr arrangement of the elements followed by a brief discussion of several other arrangements of the elements particularly spiral ones. Special attention is devoted to magnetic relationships.

In the concluding section there are thirteen diagrams where curves are drawn connecting thirteen physical properties such as density, melting point, specific heat, electrical conductivity, entropy, etc., plotted against atomic numbers. There is then a large table where the numerical values of all these properties and the atomic numbers and atomic weights are arranged in fifteen columns with increasing values downward.

There is a clear tendency for the elements to occur at about the same level in the various columns of this table, although almost every element shows marked and violent irregularities. The most regular of all the elements is tin (No. 50) which comes at almost precisely the same level in all the columns except that for the melting points. It is not clear, however,

that this marked regularity would persist if data for these properties were available for all the elements, or *a fortiori* if still other physical properties were similarly listed.

A final table lists the numerical values of these properties in the order of the atomic numbers.

ARTHUR B. LAMB

The Phase Rule and its Applications. By ALEXANDER FINDLAY, M.A., D.Sc., F.I.C., Professor of Chemistry, University of Aberdeen. Sixth edition, revised and largely rewritten. Longmans, Green and Company, 55 Fifth Avenue, New York, 1927. xv + 326 pp. 165 figs. 14 × 22 cm. Price \$3.50.

In this sixth edition the author has undertaken a more thorough revision than in any of the preceding new editions. It is evident that a careful consideration has been given to the many recent advances in the wide field covered by this treatise.

To accomplish this thorough revision the author has made somewhat extensive alterations in the general framework of the book. The introductory chapters on systems of one component have been rewritten from a general and systematic rather than a specific point of view; the chapters on systems of two components have also been rewritten and considerably enlarged. A discussion of the nature of the equilibria in intensively dried systems and of Smits' theory of allotropy has been added as well as an entirely new chapter on the applications of equilibrium diagrams.

It is a tribute to the utility and excellence of this treatise that new editions of it have been in such constant demand. We predict a similar popularity for this latest edition—which, by the way, is aptly dedicated to Wilder D. Bancroft.

ARTHUR B. LAMB

Lehrbuch der Organischen Chemie. (Textbook of Organic Chemistry.) By JULIUS VON BRAUN, Ph.D., Professor and Director of the Chemical Institute of the University of Frankfurt. S. Hirzel, Königstrasse 2, Leipzig, Germany, 1925. xxii + 508 pp. 18 × 25.5 cm. Price, unbound, 22 M.; bound, 24 M.

This comprehensive text of organic chemistry is divided into four parts: (I) Introduction, (II) General, (III) Special and (IV) Historical. The chapter headings demonstrate in a general way the manner in which the subject has been presented.

(I). The introduction comprises a description of the analysis, principal characteristics and investigational methods of organic compounds.

(II). The general part contains the following chapters: (1) Methane and its Closest Derivatives; (2) General Survey of the Formation of Organic Compounds; (3) Hydrocarbons; (4) Halogen Compounds; (5) Metallo-organic Compounds; (6) Sulfonic Acids; (7) Nitro Compounds; (8) Reduction Products of Nitro Compounds; (9) Phosphorus, Arsenic,

Antimony, Bismuth, Silicon and Boron Derivatives; (10) Hydroxyl Compounds; (11) Carbonyl Compounds; (12) Carboxyl Compounds; (13) Heterocyclic Compounds; (14) Summary and Critical Discussion (methods for determining constitution, value of physical properties for constitution, rearrangements, etc.).

(III). The special part is divided as follows: (1) Proteins; (2) Carbohydrates; (3) Fats; (4) Purines; (5) Alkaloids and Synthetic Medicinals; (6) Terpene Compounds and Rubber; (7) Resins, Styrols, Tannins, Ferments; (8) Dyes.

(IV). The historical part takes up the development of the theories of organic chemistry from the earliest time.

It will be noticed in the general part that the subject is developed by discussing in detail the character, formation and reactions of each functional group in turn. The first chapter in this part deserves special comment because it introduces immediately to the new student almost all of the common functional groups. Thus, after discussing methane, it is shown how this is converted to methyl chloride, the latter in turn to methyl alcohol. Then follow dimethyl ether, the dimethyl esters of inorganic acids, nitromethane, methylamine, dimethylamine, trimethylamine, dimethylhydrazine, tetramethyl ammonium hydroxide, methyl mercaptan, methyl sulfide, methyl sulfonic acid, zinc methyl, methyl magnesium iodide, formaldehyde, formic acid, formamide, hydrogen cyanide.

All of the chapters include a description of both aromatic and aliphatic compounds, and a comparison of the formation and reactivity of the corresponding groups in these two classes is carefully discussed. The heterocyclic compounds are left to a special chapter on account of the many unusual reactions in this field.

The fourth part is an excellent summary of the historical development of organic chemistry and is particularly to be recommended to the average student.

The book covers an extraordinarily large number of individual reactions and topics and it is difficult to see how it could be used in an introductory course in organic chemistry as this subject is usually taught in the various universities of the United States. It could be used as a text in a second course, and would unquestionably be a valuable reference book to one who has some knowledge of organic chemistry and who desires to have the outstanding facts about many of the fields of modern interest and importance. The author has made no attempt to include a discussion of the commercial applications of organic compounds or of industrial processes.

This book should certainly be added to the list of those which the student with some knowledge of organic chemistry, and which the teacher of this subject, should have at their disposal.