additional cost of 25 cents each is more than equalized by the decreased breakage.

This tube has been in use for some time in this laboratory to our entire satisfaction, and we trust it may be of some value to other chemists who make an extensive use of drying tubes. W. H. McINTIRE.

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## NEW BOOKS.

**Laboratory Experiments in General Chemistry.** By HERMAN SCHLUNDT, Professor of Physical Chemistry, University of Missouri. 85 pages. Published by E. W. Stephens Co. Columbia, Mo. 1910. Price, 50 cents.

This small volume includes the more important experiments on the non-metallic elements as usually given in a course on General Chemistry. Experiments on the metallic elements have been omitted as the author feels "that this work should be undertaken in Analytical Chemistry, and be allotted some of the time so largely used for laboratory practice in following a scheme of separations." Careful and minute attention has been given throughout to all possible questions that may arise in the students' mind. The great amount of space required for this descriptive detail and instructive advice, literary as well as chemical, has precluded the consideration of many important subjects. Thus within the eighty-five pages, phosphorus and boron find no place and the sulfur, nitrogen, and silicon acids receive but little notice. The laboratory outline is well adapted for an elementary half-year course in first-year college chemistry. The student should find the explicit directions most helpful in laboratory and reference work. Cross-references are made to two texts: Alexander Smith's "General Chemistry for Colleges" and Kahlenberg's "Outlines of Chemistry." Chapter I on "Apparatus," and Chapter V on "Equivalent Weights," deserve especial mention for clearness and completeness of presentation. Unfortunately the drawings throughout the book are very poor. WILLIAM J. HALE.

**Die Absorption.** By J. M. VAN BEMMELEN. Published by Theo. Steinkopf, Dresden. 548 pp. 12 marks, unbound; 13½ marks, bound.

Those who know the literature of colloids, know also that Van Bemmelen is one of those rare experimenters who helped to lay the foundation of much of the recent work on colloidal hydrates and at a time when but a very few investigators were studying the subject. He is still active, though in his eightieth year, and Dr. Wo. Ostwald has now, with his assistance collected his separate publications which bear most directly upon the subject of colloids and particularly the subject of absorption. Dr. Jorissen has written a five-page biography of the author as an introduction to the work, as well as a complete bibliography of his publications.

His exhaustive studies of the composition and stabilities of such substances as colloidal and precipitated ferric hydrate, silicic acid, stannic acid, etc., are here collected. He showed that this class of substances consists of the insoluble oxide with absorbed water, whose quantitative relationship to the oxide depends on the concentration of the water phase. His studies also covered the absorption of acids, salts, etc., from aqueous solutions by the colloidal precipitated oxides, and he found specific powers of absorption in some cases very marked. It seems as though each precipitate possesses, in conjunction with each different dissolved substance, a specific absorption tendency which varies both with the precipitate and with the soluble substance, and increases with increase of concentration of the solution.

The ratio between the concentration of the material absorbed and that held in the solution (absorption factor) is not a constant, as might be expected if partition of a solute between two solvents was considered as a criterion.

The applications of the researches of the author to agricultural and biological chemistry are given some attention and anyone reading the book cannot help being reminded of many practical applications of the principles described. The study of the gelatinous precipitates, commonly called insoluble hydrates, such as ferric hydrate, silicic acid, etc., are shown to be more properly, in most cases, insoluble oxides, whose water of constitution is entirely absorbed water and therefore generally not corresponding to any simple formula. The book makes a very satisfactory addition to the collected literature on colloids, as it presents the best experimental work done on that portion of the subject dealing with absorption.

W. R. WHITNEY.

**A Text-Book of General Bacteriology.** By WILLIAM DODGE FROST and EUGENE FRANKLIN MCCAMPBELL. MACMILLAN. New York, 1910. pp. 340 + XVII. Price $1.00 net.

In the preface to this volume the authors make the following statement: "There is no treatise in the English on the subject of general bacteriology except a translation of Fischer's 'Vorlesungen,' now more than a decade old. A brief but comprehensive text on this subject is a desideratum. The authors have attempted to meet this need in the present volume." The evident purpose to emphasize the value of bacteriology as a subject of general educational interest, and its claim to consideration as the subject in which the biological training of the student may be begun, is a worthy one, and in keeping with recent trend in biological education. It is certain that before bacteriology can take its place alongside zoölogy and botany as a subject introductory to real biological study, there will be need of text-books prepared with great care for this specific purpose. The present volume may well serve to

impart an elementary idea of what bacteria are and of their most important activities, and will doubtless be useful as a text in a short, introductory course in bacteriology.

The introduction (13 pages) is a brief consideration of the history of the science and of the theory of spontaneous generation of life. Fifty-two pages are devoted to Morphology, thirty-six pages to Methods of Studying Bacteria, twenty-five pages to Taxonomy, fifty-six pages to General Physiology, ninety-eight pages to the Biology of Specialized Groups, and fifty-two pages to the Distribution of Bacteria, in which section the bacterial flora of various habitats are considered in relation to their environments. Fifty pages of the section on specialized groups are devoted to the pathogenic relations, and bacterial diseases, protozoal diseases, diseases of unknown causation, bacterial poisons, and immunity are here discussed. The treatment of the various subjects is general, in accordance with the title of the book. On the whole, the text gives the impression that the original sources of information have not been consulted to a great extent, and that the sources actually employed have not always been fortunately selected.

In many places the text is obscure and in some places erroneous, as might be expected in a first edition. The italicized statement, "It is not possible to cause any permanent change in the morphology of a bacterium and thus originate a new species of bacteria" (p. 25) may be a valuable one to emphasize to beginning students, but the same can hardly be said of the statement that the Brownian movement "is due entirely to the surface tension of the liquid medium in which the bacteria may be suspended" (p. 35), or that "Anthrax spores are the most resistant spores known" (p. 49), or that Dunham's solution "consists of a 10 per cent. peptone solution" (p. 71), or that vegetative bacteria cannot survive above 60° or below 0°, as might be gathered from the table on page 137, or that "This characteristic" (phosphorescence) "is common in various forms of life, particularly in marine animal forms among the photobacteria" (p. 170), or that group agglutinins "may be removed by diluting the serum" (p. 262). Such errors as "Schaudin" (p. 29), "tumeric" (p. 69), "media is neutralized" (p. 69), "Pasteur-Chamberlain" filter (p. 78), "Bacillus tetanus" (p. 98), and "spirilli" (p. 325), may be quickly imitated by students and the habit of using them is sometimes not easily overcome. The chemical symbols employed in the book will also require some attention in a subsequent edition. In the discussion of arthrospores on page 50, reference is made to Figure 38. This figure occurs on page 125 and represents a protozoan. On page 255 the use of the word "antitoxins" when endotoxins is meant leads to confusion in the treatment of this latter subject.

The book is printed in clear type on good paper, and is well bound.

The illustrations are numerous and on the whole very good. Some of them, however, are not clear enough to convey anything to the mind of a beginning student and they should be replaced by better ones in subsequent editions. W. J. MACNEAL.

**Elements of Crystallography.** By W. S. BAYLEY, Ph.D. The McGraw-Hill Book Company. 236 pp., 300 illus. Price, $2.00 postpaid.

This book, offered "as a guide to those attempting to gain some insight into the fundamental principles of the science," is admirably printed, and well illustrated. It does not claim to be a guide to the practical study of crystals and cannot therefore be justly criticized for omissions noticed.

Considered as a simple elementary development or discussion of the science it is perhaps not unfair to point out that in two particulars at least Prof. Bayley's treatment suggests a "turning back of the hands of the clock." The general tendency for fifteen or twenty years has been to omit all tracing of the purely geometric relation between the forms of different symmetry, "holohedral" and "derived" or "partial" forms, as a needless piece of work since such forms are structurally different and can not both occur on crystals of the same substance. Similarly the reason for the preference given to the symbols of Naumann over those of Miller "because of the greater ease with which the Naumann symbols are comprehended by students who approach the study of crystals for the first time" is not in accordance with the experience of the writer. For the Weiss symbols this can be claimed but the abbreviated parameter symbols and the Miller indices lead equally quickly to the desired intercepts.

In the chapter (XII) on "crystal imperfections" Prof. Bayley presents concisely the usual variations from the ideal. Although so generally used the terms "imperfections," "distortions" and so on are not fairly correct designations, in most instances, but are attempts to set up an ideal for nature. For instance, following the general usage Prof. Bayley speaks of Fig. 208 as a "flattened octahedron" and of all such deviations from model forms as "not resembling the forms from which they were derived" whereas in fact there has been no such "derivation" and the crystal called an octahedron is simply a solid bounded by eight faces at 108° 29′ 16″ to each other. Millions of such occur but only rarely one that conforms to the added limitation that the faces must be equilateral triangles. The study of crystals has been made much more difficult by the conception of the "ideal form" which never occurs and is not in any way needed by the laws of crystals.

In the chapter on crystal aggregates Prof. Bayley does not succeed very well in attempted distinctions between "*crystal* aggregates" and "*crystalline* aggregates" and between crystal *individuals* and crystal *grains* as the following quotations show. The italics are not in the text.

"Rarely however are *crystal individuals* complete."

"*Individual crystals* that exhibit only an occasional face"..... are distinguished as *crystal grains.*"

"When the *grains* in an irregular aggregate are partially bounded by their own planes the aggregate is a *crystal aggregate.*"

"Such aggregations as these where each grain is completely or almost completely bounded by other grains are distinguished as *crystalline aggregates.*"

The chapter on crystal projection is brief and is principally the methods used for crystal drawing, clinographic projection and a little on linear projection. There is no description of projection as an aid to recognition of system and form but only as to methods of projection of determined forms.

The last fifty pages contain practically all that the space permits of the leading facts in physical and chemical crystallography.

To sum up. The writer disagrees with Prof. Bayley as to the better way of presenting the geometrical characters, but has however nothing but praise for the details of the presentation and for the admirable brief introductions to physical and chemical crystallography. A. J. MOSES.

**"Salvarsan" or "606", its Chemistry, Pharmacy and Therapeutics.** By W. HARRISON MARTINDALE, Ph.D., F.C.S., and W. WYNN WESTCOTT, M.B., D.P.H. New York: Paul B. Hoeber. 1911. 77 pages. $1.50 net.

Few remedies introduced in recent years have excited the interest shown in this widely advertized aromatic arsenic compound developed in the investigations of Paul Ehrlich, and known as salvarsan, which is the coined name for dihydroxy-diamino-arseno-benzene. The remedy was hailed as a specific in the treatment of syphilis, the scourge and curse of centuries, and anything of value here would naturally attract attention.

The little book by Martindale and Westcott contains in condensed form much of the matter which has appeared on the subject in the recent journal literature. It is a somewhat hasty compilation, and is not critically written. In fact, the whole style and aim of the book are not such as would allow it to be classed among scientific productions. But both sides of the controversy regarding the usefulness of the remedy are stated by the authors, and as pretty extended literature references are given the book will doubtless prove of value to a class of readers who wish to learn quickly the main facts in the case. J. H. LONG.

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## RECENT PUBLICATIONS.

BAYLEY, W. S.: **Elementary Crystallography.** London: Hill Pub. Co. 8°, 8s, 6d.

BARNITZKE, J.: **Ueber das Vorkommen der Porzellanerde.** Halle a/S. 4°, 21 pp., 1.80 M.