

below, while Bemelman's report (*Contribution à l'étude de la variabilité des constantes des beurres néerlandais*. Bréda, 1905, pp. 81; Abs. in *Rev. gén. lait.* 4 No. 22, pp. 521-522 (1905)), on the butter of 485 Holland cows shows that the Reichert-Meissl number quite generally fell below 24.

The question whether feeding sesame cake to cows will cause the butter to give the Baudoin reaction is of great importance in countries which require that sesame oil shall be added to oleo-margarine. Denoel (*Bull. Agr.* (Brussels) 21, 183-192 (1905)), in some recent experiments, was unable to find a trace of a test in the butter from cows fed on sesame cake. This is contrary to the results of many other experiments, and to what might be expected from the results that have been obtained by feeding cottonseed meal. The detection of cocoanut oil in butter has received a good deal of attention. Jensen (*Landw. Jahrb. Schweiz*, 19, 477-495 (1905); *Ann. Agr. Suisse*, 6, 224-246 (1905); *Rev. gén. lait.* 4, 437-447, 457-464, 481-490 (1905)) has studied the volatile acids of cocoanut oil and of butter fat and finds that cocoanut oil contains no butyric and very little caproic acid, while butter on the average contains 3.92 per cent. butyric and 1.88 per cent. of caproic acid. Kirshner (*Z. Unters. Nahr.-Genuss.* 9, 65-70 (1905)) applies this work of Jensen and separates the caprylic acid which is the chief acid of cocoanut oil from the butyric acid by the use of its silver salts.

An interesting paper by Eckles and Rahn (*Centr. Bakt.* 14, 676-680 (1905)), on the changes taking place in Hartz cheese, shows that of the total nitrogen in the ripe cheese 86.2 per cent. is in the form of albumoses and peptones, 6.7 per cent. exists as amides, 3.5 per cent. as ammonia, and 3.6 per cent. as insoluble proteids, showing a much higher percentage of water-soluble proteids than occurs in Camembert and other kinds of cheese. The changes taking place in Edam cheese in the process of ripening have been studied (F. W. J. Boekhout and J. J. O. de Vries: *Centr. Bakt.* 2 *Abt.*, 15, 321-334 (1905)) and the amount of insoluble lime is considered of great importance.

NEW BOOKS.

GENERAL INORGANIC CHEMISTRY. By ALEXANDER SMITH. New York: The Century Co. 1906. xviii+780 pp. Price, \$2.25.

It is a difficult, if not impossible, task to give, within the bounds of a review, an even approximately adequate idea and criticism of this comprehensive and important text on general chemistry.

Professor Smith has succeeded in including in his book, of comparatively small external dimensions, all that is given in the largest college texts on descriptive, inorganic chemistry, and a

fairly complete course on elementary physical chemistry as well. This has been accomplished by a rare combination of conciseness of expression with such good judgment that nothing essential for clearness is omitted. It is not too much to say that every one of the 766 pages of text shows unmistakable evidence of careful deliberation and of original thought. No one could fail to recognize that it must have taken years to compile this book and to weld it into one homogeneous whole, even though the author had not stated in his preface that "the first draft was written six years ago" and that it is the outgrowth of a course in chemistry which he has given for fifteen years.

It is natural, in fact inevitable, to compare this book with the translation of Ostwald's "Grundlinien." In spite of the difference in size, the two contain practically the same number of pages, the same amount of information on a page, and about the same subjects. It is evident that Smith agrees in the main with Ostwald in what should be taught, and in how to teach it, but there is no trace of plagiarism or even of imitation. Such close correspondences as occur result from the fact that there is but one best way to present certain subjects, and Smith has ample grounds to trust to the merits of his own work and not adopt some other way merely to create a deceptive atmosphere of novelty.

The book is full of suggestions and of pithy phrases, valuable to teachers as well as students. For instance, objection is offered to the common expression a "gas disobeys the law." Smith says: "Our procedure, in such cases, is always more logical than our language, for we never attempt to cure a gas of its error, but always the law itself by suitable modification in its phraseology." Again: "There is no such thing as a final explanation. An explanation in science never professes for a moment to give the reasons for any occurrence. We simply don't know why behavior in nature is as it is," and he defines explanation as, "a description in greater detail." He relegates the familiar statement "the mass of the universe is a constant" to metaphysics, as something transcending experience. He makes some statements, notably in his definitions, "an element is . . . a kind of matter which never exists alone," and "a simple substance . . . contains but one element combined with a certain quantity of energy," which smack enough of metaphysics to be questionable, judging them according to his own standard. The objection to the term

chemical equation, and the substitution of a single arrow for the equality mark is an innovation which the reviewer frankly doesn't like. On page 55 we read, "...the chemical equation is not an algebraic expression; it is subject to none of the rules of algebra." But on page 78 two equations are added, and terms common to both sides are canceled, as is the universal custom in handling energy equations.

It is worthy of particular notice that the chapter on the atomic hypothesis begins on page 217. One must study the book to realize how much chemistry the student is required to learn before he is trusted with this useful but dangerous implement of thought. In this portion of the book the author is at his best, developing a caustic humor, a terseness and an effective sarcasm, which makes more interesting reading than a novel. It is impossible to refrain from an illustrative quotation. "The egregious misconception that sulphuric acid is shown by this action to be 'stronger' than hydrochloric acid was disposed of, so far as the science was concerned, half a century ago. But it survives in suburban chemical circles with remarkable tenacity." It would be a fascinating occupation to discuss the book in detail, quoting many of the characteristic and clever expressions, but space forbids.

The first 530 pages are devoted to the non-metallic elements and the general principles, and the last 236 pages to the metals. The description of potassium is begun on page 548. This does not mean that the metals are neglected by any means. They are as thoroughly treated as one could wish. There is more on steel than in any other book for beginners. But the distribution of the available space and time is what is significant, illustrating the change which has been necessitated in the teaching of beginning chemistry in recent years owing to the introduction of so many fundamental, valuable, indeed indispensable principles and theories which comprise what is well named general chemistry, what might perhaps even better be called universal chemistry (translating literally the German 'Allgemeine Chemie'), because they find application in every branch of the science to-day. Many, educated under the old régime, are unable to understand why the progress of the first course is so slow when measured in terms of the number of substances taken up. A careful perusal of this book would go far to explain the phenomenon to them.

Misprints are remarkably few in number and insignificant in kind. The absence of these faults, so common in a first edition, is but another indication of what is apparent throughout, that no labor has been spared. It is therefore surprising that the index is deplorably poor. When one finds "sulphocyanates, see thiocyanates" and then finds "thio-, see sulpho-" he is apt to become discouraged. Moreover, it ought to contain at least twice as many titles as it does, to facilitate reference to the great quantities of information. It is to be hoped that the second edition, which will probably not be long in coming, will contain an index worthy of the rest of the book.

It is a serious question whether Smith has not carried a good thing a little too far, whether he has not, after all, developed his general physical chemical principles beyond what is advisable for beginners. For example, the mathematical expression of Ostwald's dilution law and the integrated expressions for reactions of the first and second order, to determine the reaction constants, really belong in a more advanced course. In the opinion of the reviewer the book contains somewhat more than the maximum amount of information which can be introduced into the minds of the average university Freshman in a course consisting of three lectures and two two-hour laboratory periods a week extending through one college year. But the use of large type for the most important portions, and of small type for the less important, the prominent headings, the summaries of principles and the lists of questions and problems at the ends of chapters, will make it easy to select topics and utilize the book in shorter courses.

For some, the adoption of this book will necessitate a thorough-going revision of lectures, and a good deal of hard work. But it is to be hoped, for the sake of the subject of chemistry, that this may not delay its coming into general use. The reviewer gladly acknowledges that he has derived much profit from the careful study which he has given the book. It is a most admirable text and one destined to become a standard.

S. LAWRENCE BIGELOW.

AN ELEMENTARY LABORATORY COURSE IN CHEMISTRY. By FRANK B. KENRICK, Lecturer in Chemistry, and RALPH E. DE LURY, Fellow in Chemistry, University of Toronto. Toronto: Morang & Co. 1905. vi+90 pp. Price. \$1.00.

"The course of Practical Chemistry outlined in this book is